A

PARKING STUDY

for

CENTRAL SQUARE IN CAMBRIDGE

by

C. David Loeks

Bachelor of Science, Landscape Architecture

Michigan State College

1947

A Thesis

submitted in partial fulfillment of the requirements

for the Degree of

MASTER OF CITY PLANNING

1950

Signature of the author _____

Signature of Professor
in Charge of Research _____

Date _____

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LETTER OF TRANSMITTAL

Arlington, Massachusetts
January 11, 1950

Professor Frederick J. Adams
Department of City Planning
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Professor Adams:

In partial fulfillment of the requirements for the degree of Master of City Planning, I herewith submit a thesis entitled "A Parking Study for Central Square in Cambridge".

May I also take this opportunity to express my sincere appreciation to you and the staff members of the Department for helping to make my stay at the Institute both pleasant and profitable.

Hoping that this thesis will meet with your approval, I remain,

Respectfully yours,

C. David Loeks


NORTH
CENTRAL SQUARE AREA, CAMBRIDGE

ACKNOWLEDGMENTS

In preparing this study I have drawn freely on the talents and past labors of many persons who have studied and reported on the problems which directly and indirectly relate to Central Square. I wish to take this opportunity to express my appreciation to these individuals and local agencies for their generosity in making this data available. Some of the ideas contained herein were first expressed by others and are included where they coincide with the conclusions which I drew from the data which is presented. Naturally, full responsibility is accepted for the use which is made of all information, regardless of source.

The following persons and organizations have been particularly helpful and their assistance is gratefully acknowledged: The faculty of the Department of City Planning at Massachusetts Institute of Technology for their patient and wise counsel regarding all phases of the study; Mr. Mark Fortune and the rest of the staff of the Cambridge Planning Board, without whose co-operation this thesis would not have been possible; Mr. Paul Corcoran and Mr. William F. Galgay and other members of the Central Square Business Men's Association for their opinions relative to significant problems in the area and the information which was made available; Mr. Joseph Guiney, one of the principal assessors for Cambridge for information relative to property values in the area; Mr. Edgar Davis, Cambridge City Engineer; Lt. Granger of the Traffic Section, Cambridge Police Department; Mr. Frank Townsend of the Cambridge Chamber of Commerce; Mr. Otis Fellows of the staff of the State Planning Board; Mr. Joseph Cressy of the

Traffic Division of the State Department of Public Works; Individuals in the engineering firms of Charles Maguire and Associates, and Faye, Spofford and Thornedyke for information relative to the Master Highway Plan; Mr. Clifford Cann, Chief Engineering Consultant for the M.T.A.; and numerous other individuals and agencies for favors too numerous to mention.

Lastly, I cannot let this opportunity pass without paying special tribute to my wife, Julie, not only for her invaluable assistance in preparing this thesis as a typist and objective critic, but what is far more important, for the inspiration, understanding and patience which has given real meaning and enjoyment to all phases of my higher education.

C. David Loeks

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FORWARD

The writer's choice of a design problem as a thesis topic (in preference to a more academic investigation) stems from a conviction that, in the final analysis, the very nature of the planning process requires that it ultimately find expression in some aspect of physical design. By treating the topic selected in the broad sense, an opportunity was afforded for applying and testing some of the methods and background material acquired at Massachusetts Institute of Technology.

This topic offered the added advantage that in that it is a critical and controversial problem affecting an actual situation an excellent opportunity was presented for working with individuals and groups of varying viewpoints. Thus, being a student, he was able to enjoy the beneficial experience of "wading in" to the planning profession without risking the danger of drowning.

In retrospect, it is appropriate to observe that the experience has served to give a clearer understanding of what Dean Hudnut of Harvard means when he refers to "the political art of planning".

This thesis addresses itself primarily to the members of the faculty of the Department of City and Regional Planning at Massachusetts Institute of Technology. Because of the high degree of technical understanding which this audience possesses in regard to the subject of this work, much laborious rationalization of accepted methods and applied principles can be safely omitted. This opportunity to be concise is not accepted lightly. It is not construed as an excuse for superficiality, nor is it regarded as a reason to be needlessly esoteric.

Because there is much ground to be covered, it is necessary to be discriminating in separating facts and ideas which are really significant from those which are interesting, but not germane. Accordingly, the writer will strive to emulate old Polonius who was once reported to have said, "Brevity is the soul of wit, ... I will be brief".

INTRODUCTION

Background: The problem of parking motor vehicles is perhaps one of the most acute and vexing of all the problems to which modern cities have fallen heir. Although there has been a noticeable tendency to regard it as a separate and distinct problem it cannot, as a matter of fact, be considered separately. Parking is part and parcel of the larger problem of providing an adequate automobile transportation system. In turn, the transportation system is not an entity in itself, but is irrevocably associated with the various land use elements in the community which it serves.

The cause of all of our difficulties with the automobile seems to be basically a planning error. Any transportation system involves three necessary elements, namely: the vehicle, the right-of-way and the terminal for exchange of cargo and storage of the vehicle while not in use. If there is a deficiency of any one or combination of these elements, the system cannot function efficiently. Shipping systems must have adequate vessels, sea lanes and port facilities. Air transportation requires airplanes, airways and airports. Rail transit has its trains, railroads, and passenger and freight terminal facilities.

The above is so obvious that it hardly bears repetition were it not that it lends emphasis to the basic fact that not until only very recently have we started to appreciate the tremendous potentialities of automotive transportation and the profound effect which it has had and will continue to have on our society.

While technical improvements in the automobile, and to a certain extent roads, has resulted in a phenomenal increase in the number and

use of this means of transportation,[1] the development of adequate right-of-ways and terminal facilities has not, by and large, kept pace with the increase in demand for their use.

Generally, curb space is no longer adequate as a terminal for automobiles in commercial districts of urban areas. While the demand for parking space has long since passed the capacity of the curb, the increase in demand for space on the road for movement and other purposes (bus stops, taxi stands, etc.) has increased the problem by reducing the curb space available for parking.[2]

This condition has resulted in a situation where full use of the system is impossible and no one is happy. Those who want to use the road for its primary purpose, movement, find their desires thwarted by parkers, and those who want to use the curb to park are often inconvenienced by the superior claim of moving traffic.

The increased mobility afforded by the automobile has resulted in a residential decentralization far beyond the ends of the public transit lines, which up until the advent of the auto was the chief limiting factor as to how far away from the city's center the urbanite could conveniently live. This phenomenon has resulted in two general effects: it has placed added demands on the highway system connect-

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1. Automotive use in terms of vehicle miles increased nearly 10 times during the 20 year period between 1920 and 1940, according to studies by the U. S. Public Roads Administration. American Automobile Association, Parking Manual, Washington A. A. A., 1946, p.18.

2. In Washington, D. C. for example there are approximately half as many legal curb parking spaces downtown in 1947 as there were in 1930. Ibid, p.23.

ing the outer areas with the city's center, and it has acted as the first link in the chain reaction of uncontrolled decentralization beyond the central city's political limits, with its adverse economic and social consequences.

It is from this combination of factors that one of the basic assumptions implicit in any effort aimed toward functional rehabilitation of central areas stems. Namely, that every reasonable effort should be made to prevent and control undue decentralization. Improvement of central retail business districts can certainly be classified as an effort in this direction.

Problem: It is reasonable to assume that Central Square is subject to many of the causes and effects listed above. Its parking problem is severe, and there is reason to believe that it is suffering economically from the effects of functional obsolescence and the competition due to the increasing attractiveness of shopping centers in outlying areas. This decline must ultimately be expressed in decreasing tax revenues from the area, with its resulting disadvantage to Cambridge as a whole.

Purpose: The basic purpose of this thesis is to study the effects of Cenral Square's parking problem, not only as it relates to the area but to the community at large, to ascertain the present and probable future demand for parking space, and to develop a program integrated with over all land use and circulation requirements directed toward meeting this need.[1]

Objectives: As has been previously stated, it is felt that the parking problem cannot be solved piecemeal but must be considered in

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1. The assumed time limit for this program is twenty years.

its proper relation to the whole planning picture. Consequently, this conviction dictates a considerably broader approach to the problem than merely determining present parking demands and then proposing off-street lots in terms of least expense and greatest convenience. The following objectives suggest the approach employed to accomplish the basic purpose of this thesis, and briefly define the limits of the study.

To determine:

1. Central Square's role in the overall community picture as a basis for obtaining an insight as to what present and future area wide planning considerations might condition the development of a parking program for the Square.

2. The nature and relationship of the principal uses within the Central Square area as a basis for understanding present and probable future land use requirements.

3. The specific nature of the parking problem including present and probable future demand.

4. On the basis of the information obtained from the preceding objective to: a) Develop a parking program integrated with other major land use requirements in the area. b) Outline basic community policies which, if adopted, would help to insure that the parking need is provided fro on a continuing basis.

Method: The following steps outline the general method employed to accomplish the objectives listed above. Detailed explanations of individual aspects of the method are included in their appropriate order in the text.

1. Comprehensive research on the general nature of the parking

problem and principal methods for dealing with it.

2. Preliminary outline of objectives and method of attack.

3. Investigation to determine what usable material relative to the problem in Central Square was available. Roughing out areas where information was lacking. Formulation of a program of original research to provide this information.

4. Material relative to the community wide picture was derived from a wide variety of sources (see list of acknowledgments). It was not possible to obtain, either through direct research or other sources, factual material relative to some aspects of this study. In cases where this information is essential to the development of the thesis, best informed opinion on the subject in question was accepted. In all cases where it was necessary to resort to this technique, this information is clearly qualified as an assumption.

5. A comprehensive field survey of all of the land uses in the area was performed. The use, condition and type of construction of all buildings was recorded in a notebook and keyed by number to a study base map. Significant physical problems and limitations were also recorded in the same manner. The information obtained by this method proved to be extremely valuable in all phases of the study, not only as a means of recording details, but what is probably more important, by providing cumulative impressions relative to the significant problems in the area.

6. Many photographs of conditions in the area were taken and are included as a means of supplementing and reinforcing the material in the text.

7. Data relative to the parking situation was obtained from the

following sources:

a. Direct field survey of the kind, amount and use of existing facilities.

b. Personal interviews with motorists as they were parking their cars.

c. A direct mail survey of most of the businesses in the area to determine all day parking needs and retail floor area ratios. This step also proved extremely useful as a means of acquainting the people in the area with the study and enlisting their support.

d. A customer questionaire survey, administered with the co-operation of local merchants.

e. Previous studies relative to the parking problem in Central Square.

PART I. THE PROBLEM

Present Conditions and Future Prospects.

Central Square and the Community

Before the specific nature of the problems in Central Square are presented, it is felt that a brief discussion of Central Square's role in the community is of value. It is intended that this section accomplish two general objectives: To "set the stage" so that the more detailed problems which follow may be viewed in proper relation to the over all picture, and to enumerate community wide problems and future planning considerations which affect Central Square and consequently must be recognized in developing a parking program for the area.

Central Square may be said to be the "downtown" district of Cambridge. While it is true that Harvard Square also enjoys a considerable prominence as a retail shopping district, Central Square is larger, offers a wider variety of goods and services and in addition, has within its area the principal centers of local governmental administration, the City Hall, the Police Department and Municipal Office Building.

History: To better understand the present situation an exposition of some of the factors which influenced the district's growth and development is of value. Historically, the Central Square district (known as Cambridgeport in the early days) developed around the intersection of three major regional travel routes; Massachusetts Avenue, connecting Harvard Square and points north with Boston; the routes from Watertown (Western Avenue) and Brookline (River Street) converging at Central and connecting these communities with Somerville and

Charlestown via Prospect Street.[1]

Favorable location with respect to the adjacent residential and employment areas and convenient access by major transportation routes are probably still the most important factors accounting Central Square's prominence as a retail trading center.

With the advent of mass public transit, shortly after the mid-point of the Nineteenth Century, the communities adjacent to Boston experienced their period of greatest growth. As these transit lines were extended outward from Boston and the population and area of the metropolis expanded, a ring of subsidiary trading centers developed at their outer terminals.[2] Central Square is one unit in this "inner belt" of retail shopping centers.[3]

With the coming of the auto age and the development of modern rapid transit, the metropolitan area experienced a second, more extensive outward growth, far beyond the limits of the "inner belt". New shopping centers were developed to serve the needs of the population in newly developed areas. This phenomenon resulted in two disadvantages to the shopping districts nearer the center of the metropolitan area. One, a relative decline in the purchasing power

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1. Hastings, L. M., The Streets of Cambridge, Their Origin and History, Cambridge, Office of the City Clerk, 1921. 48pp.

2. Hoyt, Homer. Structure and Growth of Residential Neighborhoods in American Cities, Washington, Federal Housing Administration, (U.S. Government Printing Office) 1939. Part II., Ch. I., II. and p. 159.

3. One of the first horse-drawn lines to be put into operation in the country (started in 1856) ran from West Cedar Street in Boston to Central Square in Cambridge. Streets of Cambridge,(op. cit.) p.23.

of their tributary area. (Generally, the people who have migrated to the suburbs are of higher income than those who remained in the central area. By and large they tend to shop near their residences, or proceed directly to Boston for shopping requiring a wider variety of choice.) Two, because of newer, more attractive stores, better parking and less congestion, the outlying centers are attracting people from the inner belt who would normally shop nearer the center.

On the credit side, centers such as Central Square still enjoy several actual and potential advantages which, if adequately exploited, would tend to mitigate the disadvantages listed above. These advantages as they apply to Central Square, will be cited in their appropriate order in the text which follows.

To facilitate this analysis, the position of Central Square relative to the community will be discussed as it applys to two general catagories: Population and Employment, and Transportation.

Population and Employment: How large an area and how many people does Central Square Serve? In considering this question, it is well to bear in mind that the area funtions in a dual capacity as a "downtown district" featuring a considerable variety of shopping goods and consequently attracting people from a wide area, and as a local shopping center which serves the immediately adjacent residential neighborhoods. Although it is reasonable to assume that relatively few of the latter group, by virtue of their proximity to the area, drive cars to shop, they do exert a considerable influence because they use the square for both of its capacities. On the basis of the 1940 census, it is conservatively estimated that some 36,000 persons come

under this category.[1]

It is extremely difficult to estimate the size of the tributary population which uses the Square in its "downtown" shopping capacity. Many people who live in outlying areas shop here because it is convenient to their place of work. Many people shop in the Square for one special commodity, and do the remainder of their shopping elsewhere. Moller's Furniture Store, for instance, lists customers from some forty cities and towns as far away as Dedham and Marblehead. Although 66% of them are from the municipalities immediately adjacent to Cambridge, only 10% of their customers were from Cambridge itself.

A survey of customers conducted by Gorin's Department Store in 1948 revealed a much different relationship. Three hundred and sixty eight customers surveyed came from twenty one different municipalities in the metropolitan area. However, 40% came from the immediately surrounding area, while 52% of them lived in Cambridge.

A five thousand sample survey conducted recently by another store in the area[2] over a one month period revealed the following very significant results:

	Customers surveyed	4974	
	No. towns represented	105	
From:			
	Cambridge	56.3%	
	Out of town	43.7%	
	Immediately surrounding area[3]		32.8%
	Outlying area		10.9%

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1. Living within ½ to 3/4 mile from Central Square and not closer to another shopping center. This figure should be qualified somewhat by the fact that there are many "corner grocery stores" scattered throughout the area.

2. Name withheld by request.

3. Somerville, Arlington, Belmont, Watertwon, Brighton, Brookline and Boston.

A random survey of customers in the stores conducted by the writer with the cooperation of local merchants for another purpose tended to verify this relationship.

The following table shows the relationship of Cambridge and the surrounding cities and towns with respect to population and purchasing power.

Table I. Market Data.[1]

Community	Distance from Camb.	Population	Retail Sales 1939	Percent to State Total
Boston	2	776,386	$490,396,000	28.22
Somerville	2	107,018	26,615,000	1.53
Arlington	4	44,571	9,361,000	.54
Watertown	4	38,053	12,370,000	.71
Belmont	4	29,481	5,382,000	.31
Brookline	2	59,800	22,043,000	1.27
CAMBRIDGE		111,187	46,620,000	2.69
Newton	3	79,510	22,537,000	1.30
TOTAL		1,246,006	$635,324,000	36.57%

Careful analysis of the above evidence resulted in the following conclusions:

1. Central Square has a "walking distance" tributary population of approximately 36,000 persons and living within ½ to 3/4 mile from the square.

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1. Bureau of Business Research, Boston University. New England Community Statistical Abstracts. Boston, 1949.

2. The "advertising" tributary population[1] is roughly estimated to number three quarter million persons, who live or work within a four or five mile radius of Central Square. Naturally, Central Square is not the principal shopping center for this whole group, but by reasons of accessibility falls reasonably within their radius of choice. The extent that these people favor Central Square over other centers is continually changing and is resolved in terms of individual convenience and economy in obtaining particular types of merchandise.

3. Although only about 12% of the people who shop in the Square live outside of the advertising tributary area, half of them drive, accounting for 37% of the customer demand for parking space.

4. Central Square's convenient relationship to the large employment centers of the East Cambridge industrial area and downtown Boston is a strong advantage in attradting customers from beyond its immediate surrounding area. About 44% of the people who shop in the Square live outside of Cambridge, of these, nearly one quarter also work in Cambridge.

In summary, it may be said with respect to population and employment that Central Square's position as a major retail shopping center is reinforced by the following factors: Direct relationship to a high density residential area and the stratigic location relative to home and work. (Over 67% of Cambridge's population lives east of Harvard Square and a total of one million, two hundred forty six thousand persons live in Cambridge and the immediate surrounding

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1. That is the population which the larger stores consider economically profitable to reach with advertising. (Based on sales analysis).

cities and towns.) Much of the high daytime population of East Cambridge and downtown Boston who live in the northwest quadrant of the Boston Metropolitan area have occasion to pass through or near Central Square every working day.

It is doubtful whether the next twenty or thirty years will see much change in this relationship. Although most authorities agree that the population of the cities and towns near the center of the metropolitan area has reached or passed its peak, (Cambridge, for example, declined 2% between 1930 and 1940) the chances are good that Central Square's tributary population will not be significantly reduced. It can be assumed that impending large scale urban redevelopment will tend to slow up present residential decentralization, while the rather negative attitude of the outlying suburbs with respect to the central area suggests that mass exodus on a controlled basis must await some form of Metropolitan Government.

If Cambridge city officials have anything to say about it, it can also be assumed that the home-work relationship will continue to affect Central Square's prosperity in a favorable manner. The activities of the Cambridge Chamber of Commerce and Cambridge Industrial Commission in attracting industries into East Cambridge are well known. The city of Cambridge has long actively pursued a successful policy of strengthening its industrial economy by tax inducements and other means.

East Cambridge industry, one block east of Lafayette Square.

Residential area to the west of Central Square. Ripe for redevelopment.

Transportation: Accessibility by public transit is an extremely important reason for Central Square's continued prominence as a shopping center. In the 5,000 sample survey referred to previously, the customers were asked what means of transportation they used to get to Central Square, with the following results:

Walk	35.2%		
Public Transit	46.2%	(Subway	17.0%)
		(Trolley or Bus	29.2%)
Auto	18.6%		

Of the out of town shoppers, (who comprise 43.7% of the total) 68.2% came to the area by M.T.A. It is a fare-interchange for many people from outlying districts bound for Boston, who ride busses or trolleys into the Square and transfer to the rapid transit at Central Square.[1] At present five bus lines and one street car line terminate in Central Square.

It is desirable to describe the specific routes because these surface lines create special circulation problems within the area.

Street car from Watertown Station via Western Avenue.

Bus from Faneuil and Brooks Street, Brighton via River Street.

Bus from Cleveland Circle, Newton via River Street.

Bus from Sullivan Square, Charlestown via Prospect Street.

Bus from Porter Square via Beacon, Prospect Street.

Bus loop down Pearl to Granite Street, back on Brookline to Green, (serves neighborhoods between the Square and Cottage Farm Bridge).

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1. 22,400 persons entered Central Station, December 8, 1948, according to M.T.A. Public Relations Office.

A PORTION OF THE METROPOLITAN TRANSIT AUTHORITY ROUTE MAP, SHOWING CONNECTIONS WITH CENTRAL SQUARE.

In addition a trackless trolley running from Harvard Square to Massachusetts Station passes through the Square via Massachusetts Avenue. This relationship is illustrated by the map on the preceding page entitled A Portion of the Metropolitan Transit Authority Route Map.

Mr. Clifford Cann, chief engineering consultant for the M.T.A. has informed the writer that no major changes in the system, as it relates to Central Square, are contemplated. The street car to Watertown will eventually (he didn't say when) be replaced by a trackless trolley, which will permit the removal of the car tracks in the area. The fare-interchange (a factor in encouraging people to shop at a break-in-journey point) will continue in effect.

Automobile Traffic: The automobile has been both a blessing and a curse to the economic activity in Central Square. While, as stated previously, 18.6% of the people who shop in Central Square come by car, there is ample evidence to indicate that this percentage is as small as it is because the traffic congestion and lack of parking in the area discourages the motorist from coming there to shop.

To better understand the causes of this congestion in Central Square, it is useful to consider that they fall into two general categories: those which result from inadequate physical layout within the area, and those which stem from traffic problems of city wide and regional significance. It is with the latter that this section deals for the purpose of outlining the community wide traffic considerations which affect the development of a parking program.

"The city of Cambridge contains within its boundaries the most

MAP SHOWING THE RELATIONSHIP OF CENTRAL SQUARE TO THE BOSTON METROPOLITAN AREA AND THE PROPOSED MASTER HIGHWAY PLAN

diversified traffic activity to be found in the Commonwealth, outside of Boston." This statement was made by Mr. E. F. Copell of the Massachusetts Department of Public Works in the traffic report which was performed by that department for Cambridge in 1938.[1]

Examination of a road map of Massachusetts reveals that Cambridge serves as a hub for numerous highways connecting Northeast Massachusetts and Boston. This system also carries heavy commuting traffic from the outlying residential areas to the shopping and employment centers in East Cambridge and Boston.[2] The Cambridge manufacturing district is an origin and destination for a considerable flow of commercial trucking which, because it is not allowed on Memorial Drive, is forced to make its way through residential as well as business districts.

As shown by the Traffic Flow map on the following page, through traffic converges on Central Square from several points. Massachusetts Avenue brings on the average about 17,000 vehicles per day (approximately 15% of which are trucks[3]) into the Square.

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1. Copell, E. F., Traffic Report, Cambridge 1938. Commonwealth of Massachusetts, Department of Public Works, 1938.

2. A total of 29,668 daily automobile trips were counted between the northwest sector of the metropolitan area and downtown Boston. Charles A. Maguire and Associates, The Master Highway Plan For the Boston Metropolitan Area. Boston. Joint Board for the Metropolitan Highway Plan, 1938. p.38

3. Based on 1939 Traffic Counts by the Traffic Division, Massachusetts Department of Public Works. A six hour traffic count made in October of 1949 indicates that this relationship still holds and that pre-war traffic volume has been reached. See Traffic Volume Diagram.

AVERAGE DAILY TRAFFIC FLOW IN 1939

CITY OF CAMBRIDGE

PREPARED FOR THE CITY PLANNING BOARD

1945

SCALE OF FEET

BASE MAP FROM CITY ENGINEER'S OFFICE

ARLINGTON

BELMONT

WATERTOWN

BOSTON

SOMERVILLE

CAMBRIDGE

FRESH POND

CLAY PIT

MUNICIPAL GOLF COURSE

KINGSLEY PARK

MT. AUBURN CEMETERY

CAMBRIDGE CEMETERY

HARVARD UNIVERSITY SOLDIER'S FIELD

HARVARD UNIVERSITY SCHOOL OF BUSINESS ADMINISTRATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

METROPOLITAN PARKWAY

METROPOLITAN SPEEDWAY

BOSTON & ALBANY R.R.

FITCHBURG DIVISION B. & M. R.R.

BOSTON & ALBANY R.R. ARLINGTON BRANCH

LEGEND

15,000 10,000 5,000

COMMERCIAL AND PLEASURE VEHICLES PER 24 HOUR PERIOD

DATA FROM TRAFFIC DIVISION, DEPARTMENT OF PUBLIC WORKS

Through traffic between Somerville and Charlestown and the Watertown-Brighton and Newton area generates several problems where it converges and crosses the Massachusetts Avenue flow at Western Avenue, River and Prospect Streets. Generally, all of the routes shown on the Traffic Flow Map are used to capacity during the morning and evening rush hours. According to all indications, the situation is going to get worse before it gets better. The Vehicle Registration Trends Graph on the following page indicates that Cambridge has already recovered from the war time slump and is well on its way toward making up for lost time.(Note the steepness of the curve.) The persons per automobile ratio decreased from 5.9 to 4.4 between 1930 and 1940, while vehicle registration increased 20%. Traffic engineers in the Department of Public Works have stated that they expect an increase in traffic of between 20 and 30% in the next decade.

The Governor's Master Highway Plan (shown on page 21) was developed in response to this impending traffic crisis. The plan, which is essentially a radial system integrated with an outer circumferential and an inner belt, appears well conceived from a traffic point of view. However, one might justifiably ask "what good is it to facilitate the movement of thousands of vehicles to the center of the metropolitan area if they have no place to park when they get there?"[1]

It can be readily seen that this plan when completed may well eliminate regional through traffic in Cambridge, with its correspond-

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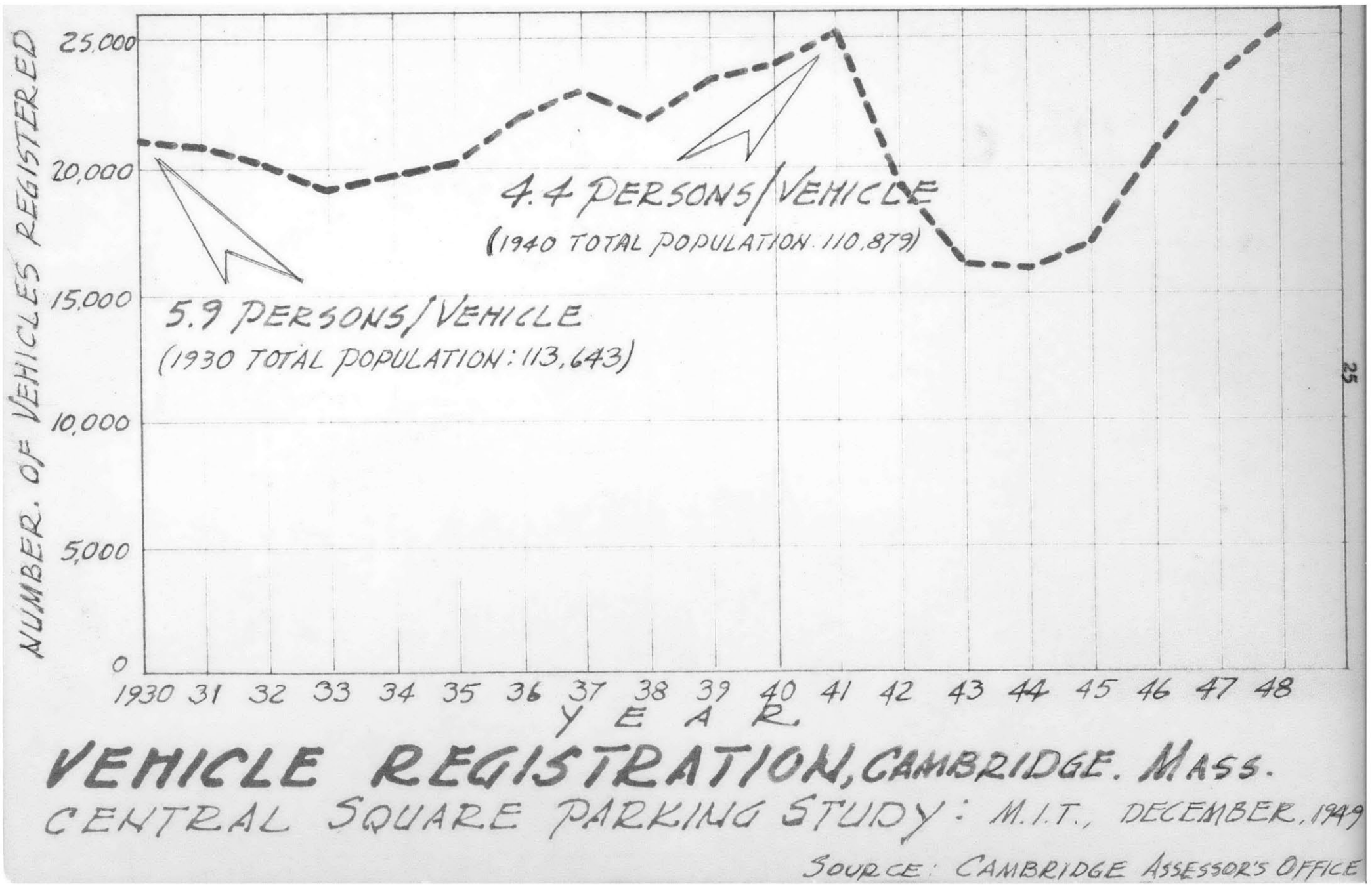
1. In fairness, it should be pointed out that the Master Highway Plan does recommend that parking should be studied and provided for in downtown Boston.



VEHICLE REGISTRATION, CAMBRIDGE. MASS.

CENTRAL SQUARE PARKING STUDY: M.I.T., DECEMBER, 1949

SOURCE: CAMBRIDGE ASSESSOR'S OFFICE

ing relief of the congestion in Central Square. Preliminary examination of the proposed route of the Cambridge link of the Inner Belt Expressway reveals that several serious criticisms could be made regarding this allignment. First of all, little effort was made to evaluate the effect of this location on the community environment and to integrate the plan with the requirements of the local situation.[1]

The Land Use and Circulation map on the following page shows that the present proposal would cut squarely through three residential neighborhoods. The residential areas to the west and south of Central Square contain some of the highest neighborhood densities in Cambridge. This area is under consideration by the staff of the Cambridge Planning Board as one of the first districts to be redeveloped under the National Act of 1949. Preliminary studies by M.I.T. City Planning Students have served to illustrate how seriously this allignment would hamper the development of a rational physical pattern in this area.[2]

The neighborhoods to the north, while not being considered for redevelopment, would also suffer to the extent that the expressway would divide them in two parts.

The recommended alternative has the following advantages to commend it. Minimum damage to the internal patterns of the residential areas. By running the southern section elevated parallel to Brook-

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1. A responsible representative of the engineering firm who developed the plan told this writer that the location had been selected on the basis of acquisition and construction costs, and indicated that they were open to enlightenment on local planning considerations. It would seem that here is a good opportunity for Cambridge to study this situation further and make its own wishes in the matter known.

2. Fall, 1949, Redevelopment Problem.

CAMBRIDGE, MASSACHUSETTS
PREDOMINANT LAND USE AND CIRCULATION [1]

LEGEND

- HOUSING
- MAJOR RETAIL CENTERS
- INDUSTRY
- COLLEGES
- PUBLIC & SEMI-PUBLIC OPEN SPACE
- MAJOR STREETS
- PROPOSED EXPRESSWAYS [2]

Note: Use district boundaries are approximate. This map is intended to show the general relationship of the principal lands uses in Cambridge in conjunction with major expressway proposals. The hatched areas denote probable future use.

Sources:

1. Land use and present major street information was obtained from the files of the Cambridge Planning Board.
2. Except as noted, proposed expressways are based on the report prepared for the Joint Board for the Metropolitan Master Highway Plan, (Governor's Highway Program, op. cit.) by Charles Maguire and Associates.

M.C.P. Thesis, Department of City Planning, M.I.T. 1949. C. David Loeks

line Street, a buffer would be created between the residential and industrial area. The residential area to the east of Brookline is gradually being encroached upon by the adjacent industry. If the construction of the expressway were integrated with needed redevelopment activities, this area might well be developed as highly attractive industrial sites.

The sketch on the following page illustrates at larger scale how this connection might be made.[1] This plan would also improve much needed regional trucking access to the adjacent industry by permitting direct access at its northern and southern ends and at Massachusetts Avenue.

The alternative proposal is conceived of as passing over Massachusetts Avenue as an elevated structure, then being depressed below grade until it connects with the Northwest Expressway. It is felt that the residential areas to the east would not suffer undue harm from this proposal. The areas to the north and east may well focus on Donnelly Field as a recreation area, while the Washington Elms-New Towne Court development tends to create its own environment (see preceding page).

It is with this reasoning as a background that the alternative allignment is accepted as a binding future consideration in devel-

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1. Made by the author as part of a redevelopment study of the Western Avenue Area, Fall 1949, Ibid.

SKETCH SHOWING A PORTION OF THE PROPOSED ALTERNATIVE ALLIGNMENT OF THE CAMBRIDGE SECTION OF THE INNER BELT EXPRESSWAY

oping plans for the Central Square Area.[1] At present, this proposal is scheduled for third stage construction, while the Northwest Expressway and the north link of the Inner Belt are scheduled for second stage construction. Accordingly, the through traffic on Massachusetts Avenue will be relieved before the north-south traffic on Western, River and Prospect Streets.

What does this mean in terms of time? Construction is already well under way on stage one, the Central Artery and the Embankment Road. Informed sources in the Department of Public Works have stated, off the record, that it is not unreasonable to expect the construction of the Northwest Expressway and the Cambridge link of the Inner Belt within fifteen to twenty-five years. The Western Expressway is stage four and therefor presumably a long way off.

The rehousing of families displaced by this construction should be coordinated with impending redevelopment activities in East Cambridge. Because proper redevelopment of these areas is also dependent on the solution of the traffic problem, (through traffic bisects these areas, see Traffic Flow Map, page 23), it is presumed that Cambridge employ every means to hasten the construction of these highways. Therefor, the completion of the Cambridge link of the Inner Belt and the Northwest Expressway within the approximate twenty year time limit of the parking program is considered to be a reasonable assumption.

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1. This assumption is made in conformance with the method outlined in the Introduction. Necessarily, the final verification of this assumption is beyond the scope and means of this study. Although it has been shown to be engineeringly feasable and desirable from the planning viewpoint, this allignment may possibly be opposed on the basis of cost. Present understanding of the matter, however, would suggest that the advantages which obtain might well be worth the added expense.

Summary: Before proceeding to more detailed analysis of the problem within the Central Square area it is well to pause and regard the situation as it has been presented thus far. Central Square has been shown to be both a local and a "downtown" retail center which enjoys a very favorable location relative to the living and working areas of a large tributary population. Its function as a major surface transit terminal and rapid transit interchange accounts for the fact that almost half of the shoppers come to the area by this means. These factors are expected to continue to be a major basis for the economic well-being of the center.

Although its capacity as a shopping center for motorists is potentially very good because of its location between commuters' residences and places of work, congestion resulting from through traffic and inadequate parking discourages people from driving to the center to shop. This problem will be eased considerably by the fact that through regional traffic will be all but eliminated when the Governor's Highway Plan is effectuated. Although these measures will be a blessing to Cambridge, they hasten the day that the parking and circulation problems must be adequately provided for in its retail centers.

Many potential automobile customers have already found that it is more convenient to shop in less crowded centers in the outlying areas. Many more will discover this as a result of the increased mobility afforded by modern fifty mile per hour expressways, unless direct measures are taken in Central Square to provide for their convenience now. If these measures are taken, Central Square may well anticipate a considerable increase in automobile trade by virtue of its very favor-

able location with respect to the proposed metropolitan highway system. Therefore it can be seen that the solution of the over all traffic problems in the Boston area could either inhibit or encourage retail trade in Central Square, depending upon what action is taken to meet the increasing attraction of existing and future shopping centers in outlying areas.

The Central Square Area from the east.

Looking east on Massachusetts Avenue from Central Square.

The Situation Within The Central Square Area

We have now examined the major external problems which affect Central Square. The purpose of the section which follows is to show the nature and relationship of the principal uses within the area and to develop an understanding of key problems which condition the formulation of a parking program.

Area: The Central Square district extends roughly two blocks north and three blocks south of Massachusetts Avenue. Its eastern limit is Lafayette Square. From there, the area extends westward to about one half of a block beyond the City Hall on Massachusetts Avenue. The area studied is shown on the Land Use Map on page 39.

Valuation: Central Square's importance to the community in terms of tax revenues is summarized as follows. In 1936 the area described above contained approximately three hundred fifty-five parcels with an assessed valuation equal to 4.88% of the city's total valuation of $163,100,900. In turn, this area paid 6.79% of the total real estate tax revenues to the city. The commercial property alone (about 100 parcels) paid over $361,000 in taxes which is 5.47% of the real estate tax revenues for the city.[1] It can be assumed that the commercial properties contribute somewhat more than this at present because store improvements have increased valuation while the tax rate is now

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1. Original data assembled by Charles V. Dolan from City Assessor's records. The basis for the above data is found in Appendix A, of the report cited below.
Dolan, Charles V.. A Report on Parking in Central Square, Cambridge, Massachusetts. 1936, (An unpublished report obtained from Mr. Paul Corcoran.)

Lafayette Square. Approaching the area from M.I.T. Note heavy truck traffic.

Central Square. A rare moment of quiet on Sunday morning.

only $1.00 less than it was in 1936.

Mr. Guiney, one of the principal assessors of Cambridge, has stated that in his opinion commercial property values in Central Square have generally reached or passed their peaks.

Number and Kinds of Stores: Central Square offers a wide variety of goods and services in a relatively small area. The following table summarizes the principal retail activities in the area.[1]

Table II. Ground Floor Retail Activities, Central Square, October 1949.

Kind of Store	No.	Kind of Store	No.
Restaurants, Cafes	35	Department	3
Grocery - Meats	24	Stationery	3
Jewelery	12	Electrical Appliance	3
Women's Clothes	11	Radio Service	3
Shoes	11	Theatre	2
Men's Clothes	8	Bakery	2
Furniture	7	Wall Paper	2
Barber Shop	7	Paints	2
Cleanser	6	Coal Co. (offices)	2
Laundry	6	Funeral Parlor	2
Tailor	5	Sporting Goods	1
Drugs	5	Cosmetics	1
Gas Stations	5	Sewing Machines	1
Taverns	4	Floor Coverings	1
Hardware	4	Furs	1
Bank	4	Newspaper	1
Florist	4	Plumber	1
Confectionery	4	Printing	1
Variety	4	Camera	1
Cigar	4	Music Store	1
Shoe Repair	4	Lock Smith	1
Bowling, Recreation	4	Sheet Metal	1
Fruit Market	3		
Liquor	3		
War Surplus	3	TOTAL	222

1. Data is from Land Use Survey. (see Method, p.7)

General Health and Character: Central Square was once characterized by a person who lives in an outlying suburb as "rather rundown, but where you can get real bargains if you know your merchandise and shop around a bit". This reputation for good merchandise at reasonable prices combined with a wide variety of choice is one of the factors which accounts for Central Square's continued prominence.

Many of the stores listed on the preceding page are "hole in the wall" activities, clustered on the side streets and depending on the adjacent residential areas for their business. However, the stores on Massachusetts Avenue generally present a favorable impression (from the front at least), particularly near the center of the area.

As would be expected, the "100% district" is adjacent to the subway entrances and exits on Massachusetts Avenue, between Prospect and Pearl Streets. The three department stores and three variety stores in this area are undoubtedly of great importance to the economic well being of the other stores in that many people are attracted to the area primarily by the presence of these large stores and stay to make other purchases at the smaller shops.

On the basis of off-the-record interviews with local merchants, the Central Square economic health can be said to be generally good, although there are indications that it is declining. Some stores have noticed a falling off in volume of business over a period of years. A large store on the southeast corner of Massachusetts Avenue and Pearl Street has been vacant for two years and is now "dividing frontage to suit demand of tenants". Most businessmen feel that the growth and

increasing attractiveness of outlying shopping centers such as Waltham and Medfordis a major cause of this decline. Some firms are reported to be seriously evaluating their chances of success in establishing branches in new suburban centers.[1]

Principal Land Uses: The Land Use Map on the following page shows the physical relation of the predominant uses in the area. The following section summarizes the significant problems generated by each of these.

Commercial: One of the problems which is becoming increasingly apparent is the growing structural and functional obsolescence of many of the buildings which are used for commercial purposes. Some of the older buildings show decided over optimism on the part of the builders as to the number of stories which this location could economically support. As a consequence the upper floors of several of these buildings are vacant or have been converted into unattractive apartments, a use for which they were never designed. Many of the buildings, including some of the newer ones, have no off street service facilities and most of those that do are hopelessly inadequate. (See map showing existing parking and service.) The effects of this deficiency on circulation in the area will be discussed later in this section.

Assuming that the demand for retail space in Central Square will continue, as has been shown in the preceding section, it is apparent that several of the older buildings should eventually be replaced with new ones of more functional design. The chances of investment capital being interested in rebuilding activities would be considerably in-

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1. An optimistic note in this picture is the fact that Woolworth's has recently announced plans to expand their present store.

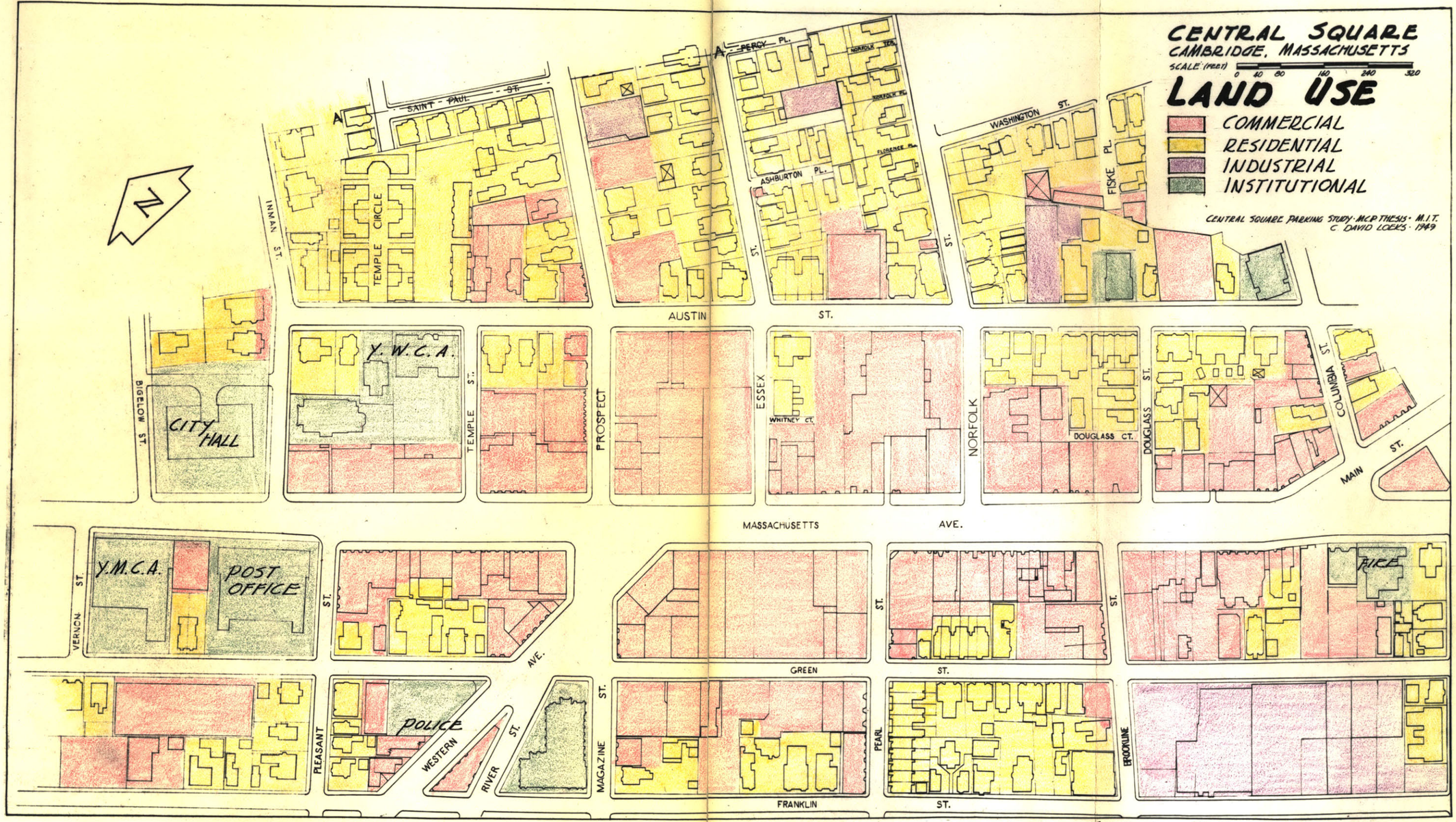
CENTRAL SQUARE
CAMBRIDGE, MASSACHUSETTS

SCALE (FEET) 0 40 80 160 240 320

LAND USE

- COMMERCIAL
- RESIDENTIAL
- INDUSTRIAL
- INSTITUTIONAL

CENTRAL SQUARE PARKING STUDY · MCP THESIS · M.I.T.
C. DAVID LOEKS · 1949



SOURCE: DIRECT FIELD SURVEY

creased if the customer attractiveness of the area were enhanced by prior provision of adequate off-street parking.

Some of the commercial activities on the side streets are basically incompatible with the present character of the area and are in need of special treatment to prevent further blighting of the adjacent residences. The trucking garages located on Green and Franklin Streets just south of the Y.M.C.A. are among these. The large semi-truck-trailers, which are brought here for maintenance and storage, are driven up and down the very narrow residential streets with the resulting hazard and loss of amenity to this neighborhood. (Although these uses were nonconforming, one was recently granted a change in zone which allowed an expansion of this activity.)[1]

The steel stock yard located to the east and across Austin Street from the Y.W.C.A. requiring heavy trucking service is another example. It is surrounded by residences on three sides. This same condition holds for the truck garage on Austin Street, which is shown directly below the legend on the land use map. The increasing number of commercial uses on the north side of Austin Street suggests that eventually all of the frontage on this street from the Y.W.C.A., eastward should be used for purposes other than housing. However, in order to safeguard the effects of future rehabilitation and redevelopment activities in the residential areas to the north, the further inclusion of noisy or noxious uses on Austin Street should be prevented.

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1. From Residence C-2 to Industry B. This is one of the few "spot zones" on the Cambridge Zoning Map.

Some stores are old.....

inefficient.....

and should be replaced.....

Industrial: Many of the preceding remarks apply equally to the industrial uses in the area. The use shown in purple on the north side of Austin Street (a Packing Box Manufacturing Company and a Lighting Fixture Assembly Plant) reinforces the argument stated on the preceding page. This building has very inadequate off street trucking service facilities.

The block in the lower right hand corner of the land use map is occupied principally by the Simplex Wire and Cable Company and the National Biscuit Company. Historically, the industries in this area have been slowly encroaching on the residential area to the west. It is recommended that these uses should be contained to the east of Brookline Street and the proposed Inner Belt Expressway. Future demand for industrial space in this area could reasonably be satisfied by removing the remaining housing east of Brookline Street (see page 27, Land Use Map).

Cambridge has a tremendous vested interest in the economic well being of its industries and other commercial activities. The past has shown, however, that in the long run, neither the community as a whole, nor its economic life is well served by the indiscriminate admixture of basically incompatible uses.

Housing: It is estimated that there are approximately three hundred and fifteen dwelling units within the area extending from the Fire House to the Post Office, bounded by Franklin Street on the South and Austin Street on the North.[1] The argument that eventually practically

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1. In 1939 there were 139 structures and 346 dwelling units in this area (including the portion of the blocks east of the fire house). Of those that reported, 80% were built prior to 1900 - none since 1919. 23% needed major repairs and private baths. Average rent per dwelling unit was $31 per month. Data from: 16th U.S. Census. Block Statistics - Housing - Cambridge, Massachusetts. 1940.

This garage brings heavy trucks through residential streets (on Green Street)

Industry and housing are side by side south of Central Square with disadvantages to each resulting.

all housing should be removed from the area immediately adjacent to the Square is well taken merely on the basis of its unfunctional relationship to the uses previously described, which have a superior claim for space in the district. This argument is further strengthened when one considers the sub-standard character of these dwellings. Old, high coverage, frame flats with poor access to light and air are crammed against eadh other and adjacent commercial uses. These uses conflict in so many respects that full return in terms of use is not possible from either.

Much of the housing is situated with stores on the sides and rear (in infrequent instances separated by a narrow service alley), on the front a pitifully narrow street crammed with trucks and automobiles, and in many cases another commercial use is directly across the street. The pictures on the following pages show the predominant character of housing in this area far better than it can be described.

The means and authority for the removal of this housing is already in existance.[1] As is well known, the area to the west, bounded by Massachusetts Avenue, River Street, the Charles River and Harvard is already under consideration by the Cambridge Planning Board as the first area in Cambridge to be redeveloped under the National Housing Act of 1949. Preliminary studies made by the writer indicate that the area directly to the south, between Brookline and River Street is also elegible for early treatment in that the housing is poor and crowds the land, and the neighborhood density in terms of persons per acre is the highest in Cambridge (138 person per acre. Maximum

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1. The proposed new use for the cleared sites is presented later in the report.

Housing Conditions

Typical views
from the street.....

.....and of back yards.
Note the leaning chimney.

desirable, 56).[1]

Thus it can be seen then that the removal of much of the housing in Central Square, without undue hardship to the occupants, is well within the scope of the approximate twenty year time limit of this study.

Public and Semi-public Institutions: The City Hall, Post Office and Municipal Building (police department headquarters) present special problems which directly affect the parking situation. Employees in these buildings pre-empt many of the parking spaces around these buildings for all day periods. Because parking space is at a premium, many people having occasion to come there for brief transactions are inclined to double park rather than walk what they consider an undue distance. The hazard, delay and inconvenience resulting from this situation contributes directly to over all circulation problems in the area.

All three of the buildings just described are sound and must be considered to be permanent within the time limit of this study. Cambridge is in need of a Civic Center and additional municipal office buildings. The site north of City Hall between Inman, Bigelow and Harvard Streets has been studied for this purpose, but as yet, no definite plans have been accepted.

At present, there is no passive "town center" type of park in or near Central Square where people can pause and rest in a pleasant

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1. Loeks, C. D., Vacant Land Limitations and Urban Redevelopment in Cambridge. The Need for a Metropolitan Policy. A report prepared as part of the requirements of Housing Seminar, M.I.T., Prof. Lloyd Rodwin, Instructor, December 1949. Map one and Table II.

atmosphere. There is also a need for a public convenience station which should be located in such an area. Many people, including this writer, feel that there is more than adequate justification for such facilities in terms of added attractiveness and amenity which would result.

The only other public building which deserves special attention is the Fire Station (relatively new) on Massachusetts Avenue at Lafayette Square. Future circulation plans for the area should take into consideration the fact that public safety requires that fire fighting equipment have unrestricted access to the adjacent streets. As will be shown later, there is evidence to indicate that there is a potential hazard being generated here as a result of traffic congestion.

The present location of the First Baptist Church in the triangle formed by River, Franklin and Magazine Streets may present a limitation on the adequate provision for circulation at this complicated intersection, as will be shown later. The building is old, and will probably be structurally obsolete enough to warrant its removal by the time future street proposals, which require this step, would be effectuated.

The Y.M.C.A., Y.W.C.A. and the other churches in the area offer no serious problems and are felt to be generally desirable in this area from a social point of view. The existance of these elements widen Central Square's usefulness to the community in that it now serves as a civic and cultural center in addition to its function as a retail trading center.

Circulation: As was stated in the Introduction the problem of parking is really only one aspect of the larger problem of providing an adequate vehicular circulation system.

The cause of all the difficulties arising from circulation in Central Square can best be summarized in three words, "conflict of interest". The pedestrian, who is interested in crossing the street safely, is in basic conflict with the motorist, who wants to use the street to pass quickly through the area. By the same token, the man who is interested in parking his car conflicts with those who want to use the street for movement. Truckers, who wish to deliver goods to stores, block the streets conflicting with those who want to move on.

Many more examples could be cited, but in the final analysis it all boils down to this: Generally, circulation conflict and resulting congestion develops when different people want to do different things at the same place and at the same time. Logically, the difficulty could be resolved by separating the conflicting interests in terms of time or space. Unfortunately the limitations of existing situations often prevent the ideal application of the principle of separation. Where this is so, the issue is best resolved by carefully deciding which interest has the superior claim.

It is the purpose of this section to present key circulation problems in Central Square and to develop the justification for the priority upon which the solutions must be based.

1. Massachusetts Avenue (68 feet wide, angle parking on both sides): Anyone who has had occasion to drive through Central Square on Massachusetts Avenue during the "five o'clock rush" has experienced

the annoying delay and actual danger which results when a tremendous volume of through traffic trys to make its way between the protruding posteriors of parked and parking vehicles on one side, aggressive busses and trollies on the other, and with droves of homeward bound pedestrians emerging from the subway exits and boarding busses in the center of the street. The night photograph on the following page is not untypical. On five trips through the area by car, during the rush hour, this writer averaged less than five miles per hour between Lafayette Square and the City Hall. If the time lost to all persons as a result of this condition could be expressed in terms of economic loss, the cost would undoubtedly be staggering.[1]

It has been shown that traffic congestion is the major determent in driving to Central Square to shop. If the economic health of the area is to be enhanced or even preserved, this situation must be ameliorated. We have seen that through traffic is a major cause of congestion, but that it cannot be reduced until the effectuation of the Cambridge section of the Governor's Highway Plan which is still probably at least fifteen years away. It follows, therefore, that the short term solution, at least, lies in reducing the conflict generated by those elements which it is possible to change.

Angle parking on Massachusetts Avenue is a case in point. Those thoroughly familiar with the problem have been recommending that it be changed to parallel parking for many years, but this measure has

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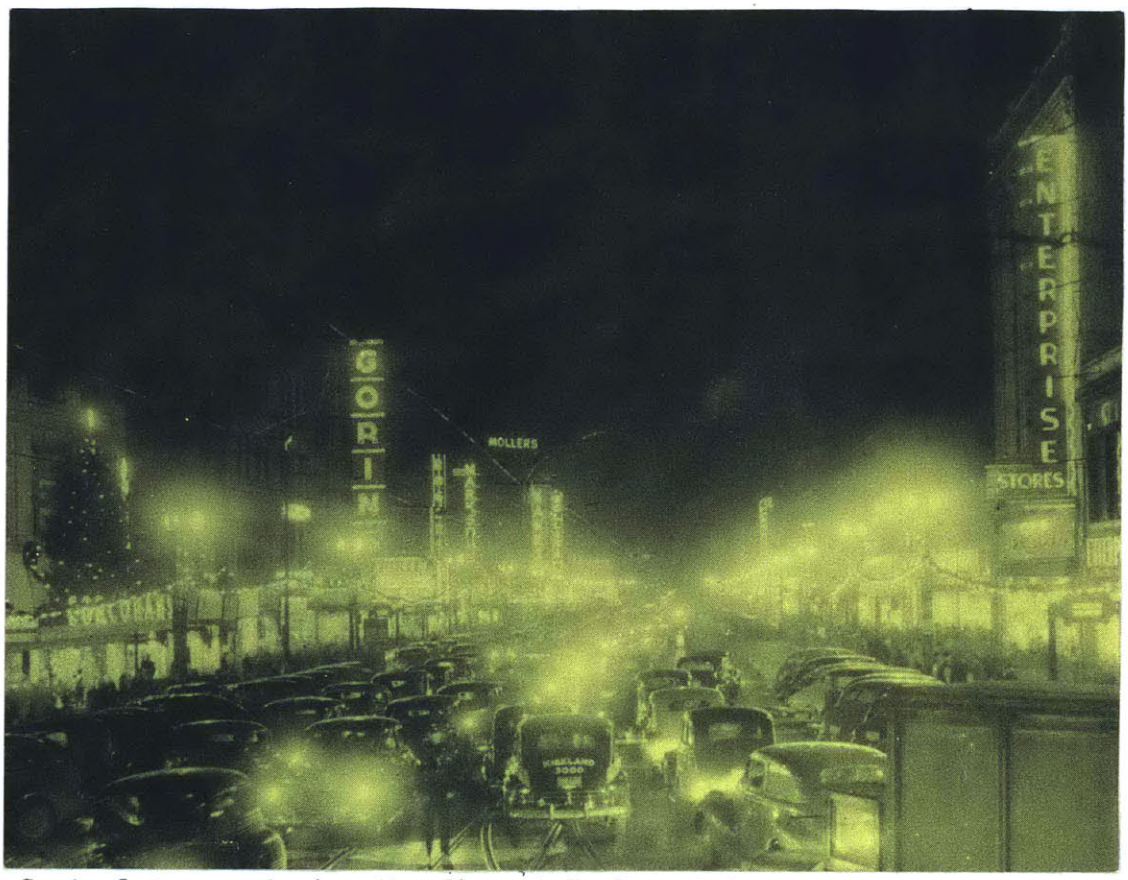
1. 7,069 vehicles of all types entered the area on Massachusetts Avenue between 12 noon and 6 P.M. on October 10, 1949. (See Traffic Volume Diagram.)



Central Square during the five o'clock rush hour.

What the cop in the foreground might be thinking, if he were an ex-Shakespearean actor:

"Mercy o' me, what a multitude are here." (King Henry VIII)

"From the four corners of the earth they come." (Merchant of Venice)

"What! Will the line stretch oot to the crack of doom?" (Macbeth)

"Now I would give a thousand furlongs of sea for an acre of barren ground." (The Tempest)

Angle parking on Massachusetts Avenue

not been possible without providing off street parking because of the considerable reduction in available parking space at the curb.[1]

One of the first steps in any program designed to improve circulation in the area should be to provide the necessary off street parking which would make the substitution of parallel parking for angle parking possible. As can be seen from the photograph on the preceding page, there are now only two effective moving lanes to carry the great bulk of traffic on Massachusetts Avenue. It is estimated that the added space for movement gained by eliminating angle parking would increase the traffic carrying capacity of the street by between 50 to 70%.

This step is also warranted by the hazard which the present situation presents to the people whose safety deserves first consideration, the pedestrians. The Central Square area had the highest number of pedestrian accidents in the city in 1937. (38,669 pedestrians were counted between 9 A. M. and 5 P. M., and 35 pedestrian accidents for the year.)[2] Study of police accident records indicates that many of these resulted from people stepping from between diagonally parked cars to cross the street in the middle of the block,

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1. There is even some question as to the legality of present parking on Massachusetts Avenue. According to Massachusetts law, a city must first obtain permission for the location and placement of parking meters from the Department of Public Works before installing them on a state route. According to Department of Public Works officials, Cambridge has not secured this permission for any parking meters coming under this category. Massachusetts Ave. is a marked state route (2-A) on the official route map of the state. However, in the past, the Department of Public Works has not demonstrated much inclination to interfere in local matters such as this.

2. Traffic Report, Cambridge 1938, (op. cit.).

rather than at the crosswalks. It is recognized that changing angle parking to parallel parking will not in itself improve pedestrian safety. It will, however, simplify the problem of insuring that pedestrians cross the streets at designated points which, when necessary, can be under police supervision.

2. The Central Square Intersection: The Traffic Volume Diagram on the following page lends an insight as to the complicated turning movements which result when six streets, carrying through traffic of all kinds, intersect. Adequate channelization of this traffic with resulting improvement of pedestrian and vehicle safety will have to await the removal of the surface trolley which comes from Watertown on Western Avenue and turns left off Massachusetts Avenue.[1] Future improvements of this intersection must take into account the fact that five bus lines (six when the trolley is replaced) must terminate and turn around the triangle formed by Western Avenue, Magazine and Franklin Streets.

The necessary prohibition of left turns at Massachusetts Avenue and Central Square diverts this traffic onto Pearl and Pleasant Streets to the south, and Temple, Essex and Columbia Streets to the north. All of these streets are too narrow for the load imposed, especially when used for two-way traffic and parking, as in the case of Columbia and Pleasant Streets.

3. Prospect Street (36 feet wide, parking one lane, traffic two lanes): This main approach route to the area from the north is much

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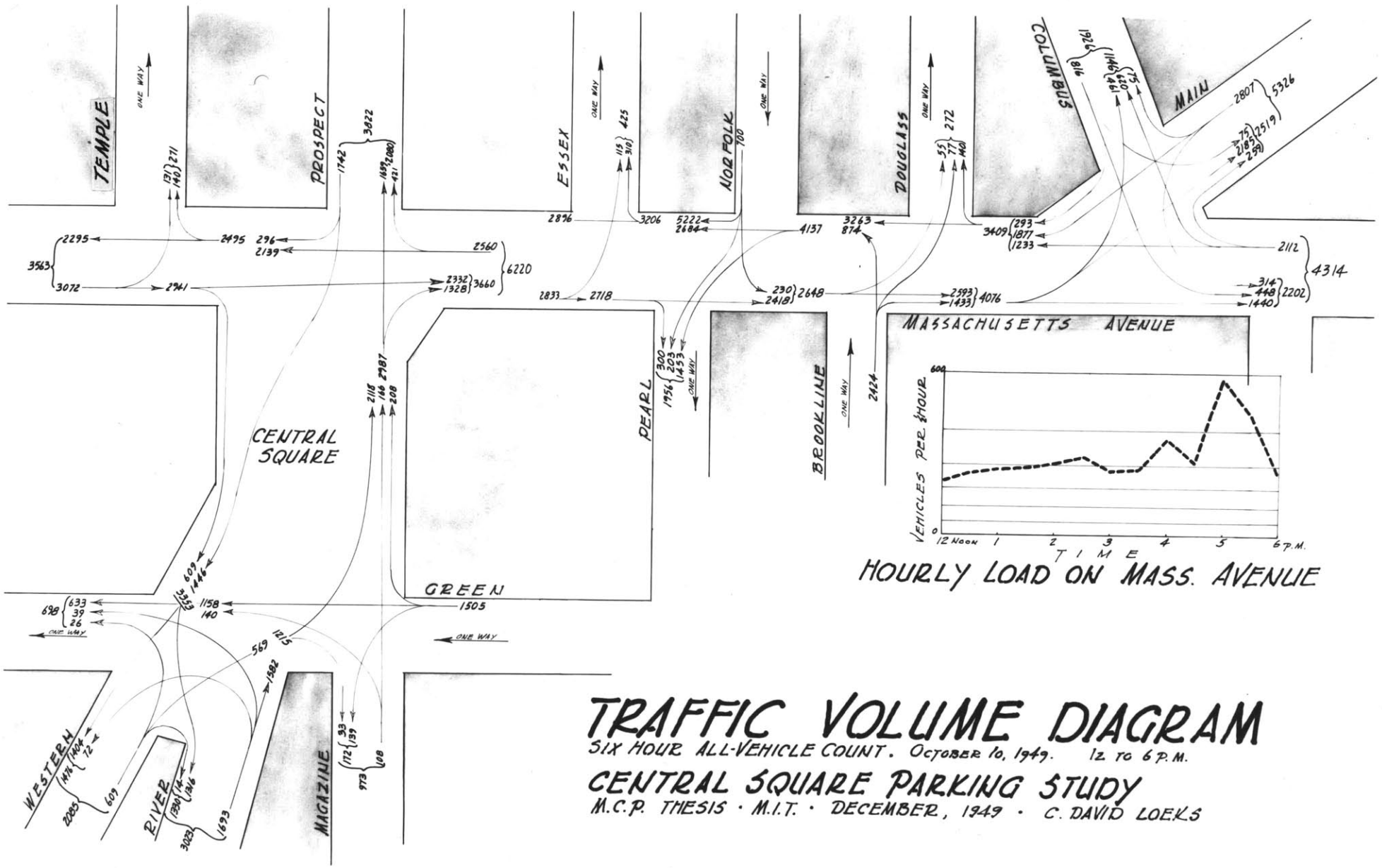
1. Assumed as taking place within ten years.



TRAFFIC VOLUME DIAGRAM

SIX HOUR ALL-VEHICLE COUNT. OCTOBER 10, 1949. 12 TO 6 P.M.

CENTRAL SQUARE PARKING STUDY

M.C.P. THESIS · M.I.T. · DECEMBER, 1949 · C. DAVID LOEKS

SOURCE: MASSACHUSETTS DEPT. OF PUBLIC WORKS

too narrow to serve its purpose adequately. Metered parking along its west side reduces the number of moving lanes to one in each direction, often stopping south bound traffic entirely. The space for movement is not enough to efficiently carry up to 3,822 vehicles of all types both through and local in one six hour period. (See Traffic Volume Diagram.)

4. Lafayette Square: As in the case of Central Square, needed channelization at this complicated intersection has awaited the removal of the surface trolley cars. Now that this has occurred on this section of Massachusetts Avenue, temporary measures can be taken to ease the situation. However, the ultimate solution must be integrated with the requirements of the Inner Belt Expressway.

5. Green Street (26 feet wide, parking two lanes, traffic one lane): At present, this street is used for parking, traffic and as a service alley for adjacent stores. Although parking is prohibited along certain sections, it is rarely enforced and total blocking of this street for movement frequently results when trucks make deliveries to the stores. Parking meters on both sides of this street between Pleasant and Western, leaving only one lane for movement, often produces the same effect.

6. Franklin Street (26 feet wide, one way; parking two lanes, traffic one lane): Inadequate regulation and enforcement of parking results in congestion. Trucking to adjacent industry and through traffic, by-passing Massachusetts Avenue, place demands on this street far beyond its capacities.

7. Other streets in the area: Generally, the same conditions

which affect Green and Franklin Streets, also apply to the other side streets in the area. All are too narrow to be used efficiently and safely in their present manner. Temple, Essex and Douglass Streets are only 20 feet wide and fail completely when they are used simultaneously for traffic, parking and as service alleys for large trucks unloading merchandise. What would happen if there were a fire and it became necessary to move fire fighting equipment on these streets during the rush hours?

Summary: It has been shown that the needs of moving traffic, service to the stores and storage of automobiles are in basic conflict on the streets in the area. What principles should be applied in determining which use has the superior claim?

If we accept that the primary purpose of a public street is the passage of persons and vehicles, then it follows that in cases where the public interest is best served this purpose should receive first priority, and any other use of the street should in general be conducted in such a manner that movement is not unduly impaired.[1]

However, it can also be demonstrated that it is in the public interest that the subordinate uses, adequate parking and service facilities are provided for in the area. Since the streets are inadequate for the need and in general cannot economically be widened,

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1. The zoning ordinance for the City of Cambridge clearly recognizes this principle by stating in Article IV., Section 6, that..."any building erected for commercial purposes shall be designed in such a way that loading and unloading of motor vehicles delivering or receiving goods to or from such premises shall take place in a manner that will not obstruct or interfere with the free pedestrian or vehicular movement on the public right of way."

the conclusion to be drawn from such a premise is obvious. The deficient facilities must be provided in areas off the streets.

Objectives one and two which are stated on page 6 in the Introduction are now considered to be accomplished. We will now proceed to objective three, the presentation of the specific nature of the parking problem in Central Square, as a basis for determining present and probable future demand for off street parking space.

The Service Problem

Austin Street

Essex Street

The Present and Future Demand for Parking Space

This section will endeavor to provide a reasonable answer to the question of how much off street parking space is needed now and will be required in the next twenty years.

Method: Because of limitations imposed by lack of staff it was necessary to devise several "short cut" methods for determining present demand for space. In essence, the main steps were as follows:

1. Present parking capacities were determined by direct survey.
2. Present use was determined by:
   a) Recording the average number of cars parked and vacant spaces in all locations.
   b) Observing how long people parked in various locations. Conclusions were verified by spot interviews with motorists.
   c) Noting number and location of illegally parked cars and cars which are lawfully allowed to be parked in such a manner as to impair circulation.
3. Present demand is represented to be the "high" average number of cars which were counted at given times over a period of two months and is expressed in terms of the number of cars which need space for three general time catagories: short stops (one hour or less), two to three hour "shopping trips" and all day parkers.
4. The above results were compared with those determined by totaling the needs of the principal generators. The needs of the retail stores in the area were estimated in this step by applying an

assumed parking space ratio to the total floor space used for sales and display on Massachusetts Avenue. Merchants were surveyed by direct mail to determine their all day parking needs. (See Appendix A.) The demand generated by the Municipal Building, Post Office and City Hall was determined by interviews with the building occupants and field observations.

5. Present off street parking requirements were determined by: subtracting the total number of cars which can efficiently be accommodated in present facilities without unduly impairing traffic, from the total demand for space as determined by steps 3 and 4, plus an assumed increase in demand due to the added attractiveness of the area to car shoppers, which results when off street parking is provided.

6. Future off street parking requirements were estimated by applying an assumed per cent increase in demand over and above step 5, the basis for which is explained in its appropriate order in the text which follows.

Present Capacities: There are some 880 lawful spaces (both off street and at the curb) in the area shown on the existing Parking and Service Map on the following page. Of these, 628 are at the curb, 151 are in store operated lots and approximately 102 are found in small miscellaneous parking and service courts throughout the area. Present curb capacities within two blocks of Massachusetts Avenue are summarized in the following table.

CENTRAL SQUARE
CAMBRIDGE, MASSACHUSETTS

SCALE (FEET) 0 40 80 160 240 320

EXISTING
PARKING & SERVICE

- PRIVATE OFF-STREET PARKING
- PRIVATE SERVICE & PARKING
- CURB - 1 HR. METERED
- " " SIGNS
- " PROHIBITED (BUS-STOPS, ETC.)

(NOTE: UNREGULATED SPACE IS LEFT WHITE)

CENTRAL SQUARE PARKING STUDY - MCP THESIS - M.I.T.
C. DAVID LOCKS - 1949

N

SAINT PAUL ST.
TEMPLE CIRCLE
PERCY PL.
NORFOLK TER.
NORFOLK PL.
FLORENCE PL.
ASHBURTON PL.
WASHINGTON ST.
FISKE PL.
INMAN ST.
AUSTIN ST.
BIGELOW ST.
CITY HALL
CHURCH
TEMPLE ST.
PROSPECT
CORCORAN'S
ESSEX
WHITNEY CT.
THEATRE
NORFOLK
DOUGLASS CT.
DOUGLASS ST.
COLUMBIA ST.
MAIN ST.
BUS, SUBWAY
MASSACHUSETTS AVE.
TAXI
FIRE
VERNON ST.
POST OFFICE
Y.M.C.A.
PLEASANT ST.
GAS STA.
WESTERN AVE.
RIVER ST.
MAGAZINE ST.
HARVARD BAZAR
MANHATTEN MARKET
GREEN
FRANKLIN
PEARL ST.
BROOKLINE
INDUSTRY

Table III.

Present Curb Parking Capacities in Area Adjacent to Central Square.[1]

Type of Facility	No. of Spaces	% of Total	Curb Footage[a]	% of Total
Meters				
Diagonal	198	31.5	2,410	10.8
Parallel	134	21.3	3,630	16.0
One Hour	129	20.6	2,800	12.5
No Regulation	167	26.6	4,375	19.5
Restricted[b]			9,280	41.2
TOTAL	628	100.0	22,495	100.0

a. Includes some drive entrances.
b. Bus stops, cross walks, taxi stands, no parking at any time, etc.

Present Use: Curb: The installation of metered parking considerably simplifies the problem of determining how the curb spaces are being used. With the exception of a small minority of "meter feeders" these spaces are used for less than one hour. People who were interviewed on Massachusetts Avenue almost unanimously stated that they considered the hour time limit adequate for their purpose.

Although there is a high turn over, it is seldom that there are over 10% vacancies during the afternoon on Massachusetts Avenue. On Thursday and Saturday nights and during the pre-holiday rush, several tours down Massachusetts Avenue were made without observing a single

1. Area shown on map on preceding page, considered to be the maximum convenient walking distance to destination on Massachusetts Avenue.

vacancy.

Generally, the people who want to shop for over one hour tend to seek the unmetered parking spaces on the side streets. On several occasions during the afternoon 30 to 40% vacancies were noted in the 22 metered spaces on the south side of Austin Street, while the one hour spaces directly across the street were filled to capacity! The short term parker is apparently being adequately provided for, while the people who want to stay longer (of which there are a considerable number) evidently prefer to invade adjacent residential streets and walk excessive distances to their destinations, rather than return to put more money in the meter.

Over the three month period that the author studied the area, he gained the impression that a state of near-anarchy prevails relative to police enforcement of the unmetered curb space in the area. During this time a startling number of violations were observed. The inevitable conclusion is that police enforcement is so lax that the violators feel reasonably confident that they will not be prosecuted. On one trip through the area 90 cars were seen that were illegally parked.[1] Of the 14 meters on Green Street next to the police station, 12 were observed to be showing violations at one time. Cars have been parked simultaneously on both sides of Brookline and Pearl Streets, north of Green, although both sides are in a prohibited zone.

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1. That is the cars were either parked in a clearly marked prohibited zone, or the violation flag was showing on the meter. This figure does not include meter violations on Massachusetts Avenue, most of which can reasonably be forgiven because of the high rate of turnover.

In many other cases, parking is either actively encouraged where it shouldn't be allowed (for example, the meters on Essex Street), or passively permitted by the failure to provide adequate regulation. Franklin and Green Street, east of Pearl, are examples where cars may legally park on both sides for an indefinite period because there are no regulations posted. It must be recognized that adequate effectuation and enforcement of curb parking regulations can never be obtained unless off street facilities are provided to make up the deficiency of curb space.

In summary, it can be reported that the parking meter has solved the problem for the short term parker, but that the long term parker has been forced to park in adjacent residential areas. Lack of enforcement and poor regulation encourages improper use of the streets by motorists and truckers and is considered a major cause of congestion. It is apparent that this situation will not be corrected until needed off street facilities are provided.

Off street: The off street parking facilities in the area which are provided by the stores do not contribute much toward the solution of the parking problem. Their small size, inadequate layout, poor advertisement, and the congestion on approach streets, discourage the full use by their customers. The private service alleys are frequently so crowded by the cars of adjacent business men that their primary purpose is impaired. The facilities on the site of the Post Office for employees are evidently being over taxed as they are usually filled to capacity. This situation also obtains at the City Hall where city employees' cars are parked on both sides of Bigelow Street and in the

One Hour Zone on Inman.

Present Demand: The following are the results of the analysis of present capacities and use of parking facilities (legal and otherwise) in Central Square.

Table IV. Total Number of Cars Parked.[1]

213	on Massachusetts Avenue
214	on streets north of Massachusetts Avenue
236	on streets south of Massachusetts Avenue
80	illegally parked throughout the area
254	parked off street (store lots & service alleys etc.)
1017	TOTAL

Allowing an absolute minimum of 10% for needed vacant spaces within two blocks of Massachusetts Avenue, at least 1100 car spaces should be provided to reasonably satisfy the demand of a normal working day. Of these, it is estimated that the demand according to time is as follows: All day: 340, one hour or more: 450, less than one hour: 310.[2]

As a check on the above, the demand for parking according to the needs of the principal generators was calculated by the method outlined in step 4 on page 60. It will be noted that this demand is somewhat higher, mainly because retail needs were computed on a floor area ratio basis. The standard which was applied (1:1 ratio) is considered

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1. Average of several counts made on week day afternoons between October 20 and December 10, 1949. This area includes the overflow into areas outside of that studied to determine present capacities.

2. Based on step 2, part b), described on page 60.

an absolute minimum.[1] In that the space that is actually used for retail parking is much less than that required by applying admittedly minimum floor area standards (roughly 700 spaces as compared to 870 spaces), it can be concluded that Central Square is not getting nearly its share of car shoppers. The required ratio might easily go higher if the area were made more attractive to car shoppers. The following table summarizes the results of the study of the needs of major uses in the area.

Table V. Present Demand According to Principal Generators.

Generators	Total Need	Needs of Employees (All Day)	Total	Needs of Clientele More than one hour	Needs of Clientele Less than one hour
Commercial	1105	235[a]	870[b]	615[c]	255[c]
City Hall	60	40[d]	20	5	15
Post Office	38	30	8		8
Municipal Bldg.	40	30	10		10
TOTAL	1243	335	908	620	288

a. Based on direct mail sample survey of merchants.
b. Result of application of floor area ratio of one foot of parking for each square foot of floor area used for sales add display.
c. Estimated by applying same per cent relationship which obtains from present use of facilities.
d. Needs of public buildings are based on interviews with occupants and field observations.

1. Most authorities recommend a floor area ratio of 2:1 as a minimum with 3:1 preferred. There are approximately 262,000 square feet of space used for sales and display in the stores fronting on Massachusetts Avenue between Inman Street and Lafayette Square.

Present Demand for off street parking space: Let us accept the conservative estimate of an effective demand for 1100 car spaces in the area. If we deduct from this the amount that can reasonably be parked at the curb without causing undue traffic congestion and the number of cars which are now being parked off street, without impairing truck service to the stores; the result is the present number of cars which should be parked in off street facilities. However, other communities have found that demand for off street space immediately increases when the facilities are provided because of the added attractiveness of the area to automobile shoppers. On the basis of what could be learned from their experience this increase is estimated to be 30%. The computation of present demand for off street parking space follows:

	1100		Present total demand
628			Present legal curb capacity
-234			Minimum reduction of legal spaces to provide adequate circulation.
394	-394		Present rational curb capacity[1]
	706		Total off street requirements
	-230		Present rational capacity of all off street facilities:
	476	476	Off street spaces needed
		+210	Assumed 30% increase in retail parking space demand (700 cars)
		686	Estimated present additional off street parking spaces needed to provide for normal daily use of the area.[2]

1. Includes removal of angle parking on Massachusetts Avenue (98 spaces) and all parking on Temple, Prospect, Essex, Norfolk, Douglass and Pleasant, and from one side of River, Magazine, Pearl, Brookline, Green and Franklin. This much is considered a minimum even under present conditions, and would be essential in order to provide adequate circulation to and from future parking lots.

2. On Thursday and Saturday nights the total demand is approximately equal to the day time demand because many all day parkers have gone home. Pre-Christmas demand, however, is estimated to number approximately 1300 cars.

Future Off Street Parking Need: It is fair to assume that if Central Square provides adequate parking so can and will other competing shopping centers (who have not already done so). Thus, the immediate increase in demand which is anticipated might well be diverted to other competing centers as they provide space and a new equilibrium is established. However, the larger metropolitan traffic considerations discussed earlier in this report are expected to cause the total demand for retail space to increase. Vehicle registration is on a sharp increase in Cambridge. Metropolitan traffic is conservatively estimated to increase between 30% and 40% in the next twenty years; and, most important of all, the completion of the Cambridge section of the Master Highway Plan is expected to make Central Square shopping accessible to many more motorists. The added demands that the anticipated increase in local traffic might make on the streets might very possibly necessitate the further reduction of curb parking on some of the side streets in the area, (the north side of Austin Street for example). Accordingly, if the factors cited above continue in effect, it is estimated that the net increase in demand for all types of parking in twenty years will be 40% greater than that which present use of the area now indicates.

The estimation of off street parking needs in twenty years follows:

494	1550	Future total demand
494		Present rational curb capacity
-149		Probable future reduction of curb space.[1]
345	-345	Future rational curb capacity
	1205	Gross off street requirements
	-230	Present off street capacity
	975	Additional off street spaces needed in 20 years.

Of the 1550 total demand it is estimated, on the basis of present use, that the demand according to time limit will be roughly as follows: All day; 400 cars, one hour or more: 690 cars, less than one hour: 460 cars.

1. Removal of curb parking from north side of Austin, west side of Bigelow, east side of Columbia, and the remaining parking from Brookline, Green (east of Pearl) and Franklin Streets.

Front of City Hall

Side of City Hall

SUMMARY

1. Central Square by virtue of its location in the metropolitan community functions as an important trading center for Cambridge and parts of surrounding communities.

2. Future community wide planning considerations indicate that Central Square will continue to enjoy a favorable location and potentially stands to benefit from the added accessibility afforded by the Proposed Master Highway Plan.

3. However, its continued success as a trading center is assured only if it provides adequate terminal facilities for automobile traffic.

4. The present streets in the area are totally inadequate to be used simultaneously for movement, parking, and service to abutting commercial activities.

5. Therefore, the economic health of the area and the city's present yearly tax revenue of over $360,000, which the businesses contribute to the city, can be maintained only if the streets are freed for their primary function, moving traffic, by the provision of adequate parking and service facilities off the streets.

6. The present housing in the area has been shown as definitely sub-standard and an impediment to the rational development of the area for its dominant function, as a retail shopping center.

7. This housing can be removed in conjunction with impending redevelopment activities in East Cambridge, under the National Housing Act of 1949.

8. At present the need for additional off street facilities is

estimated to be 700 car spaces. On the basis of present trends, this need could easily increase to nearly 1000 cars in twenty years. It can be seen at this point that if this need is to be even partially met, much of the land now used for housing in the area will have to be converted to off street parking.

Part II. The Solution

A Parking Program for Central Square

The basic arguments and the need for off street parking, as well as the general land use frame work within which the proposed solution must fit, has been presented in Part I. The purpose of the section which follows is to examine some of the alternatives which might conceivably be applied to solve the problem, select the most appropriate means for the particular conditions in Central Square and to present a program of parking and circulation proposals directed toward meeting the need.

Alternatives: Responsibility: Who should provide the needed facilities in Central Square? Off street parking in central business districts fall into three general categories: 1. Those which are owned or leased by private capital as a profit making enterprise. 2. Those which are provided by merchants for the convenience of their customers. 3. Those which are provided by the municipality for use of the general public.

The situation in Central Square is not conducive to private operation of lots for profit because it is so close to the unrestricted parking on adjacent residential streets. Merchants in the area have tried on a piece meal basis to provide parking for their customers. Their efforts have not been successful in correcting the situation because of their necessarily small scale and the over all complexity of the circulation problem. It becomes increasingly apparent that the magnitude of the over all problem is too great to be solved by the sporadic efforts of private individuals or groups, but can only be solved by the effectuation of a comprehensive program administered by an agency with adequate

authority to deal with the situation.

Therefore, it is the writer's conviction that, if the needed facilities are to be provided, they must and should be provided by the city. Further reasons in support of this stand are summarized as follows:

1. The provision of parking for Central Square has been clearly shown to be a public purpose. Massachusetts law specifically enables cities and towns to appropriate money for the acquisition and maintenance of off street parking facilities.[1] Many municipalities in the state have already provided free public parking in their downtown areas.

2. The city can acquire large sites by right of eminent domain and coordinate parking with an over all traffic and circulation program. The efforts of private persons can be balked by a single stubborn property owner, who refuses to sell.

3. The provision of general use parking facilities is a logical extension of the responsibility of the community to provide highways and roads.

4. The city as a whole has a vital stake in the preservation of the tax revenue derived from business in the area. If present inefficient use of the streets is allowed to continue, the resulting decline in trade must ultimately be reflected in declining valuations.

Finance: How should the needed off street facilities be paid for?

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1. Chapter 50, Section 5 (33). Massachusetts General Laws

There are two kinds of benefit which would result from the provision of off-street parking. One is a direct benefit to the motorists who use the area and the merchants who profit from an increase in trade. The other is a more subtle benefit to the community as a whole as a result of increased traffic efficiency and safety, and stabilized valuation in downtown areas. Justifiably, those who benefit the most, the merchants and motorists who stop at the Square, should contribute the most. The revenues from parking meters in the area provide an excellent means for collecting the part of the motorist's contribution.[1] The merchants can best make their individual contributions by paying a stipulated betterment or benefit assessment which is expressed as a pre-determined percentage of their assessed valuations. Those whose private business requires all day parking in the area, should be charged a suitable fee for use of off street parking when it becomes available. The communities share should, if possible, be appropriated from general funds.

There is some possibility of obtaining federal financial aid under the National Housing Act of 1949, if the provision of parking is coordinated with redevelopment in the area. (Capital grant by the federal government to defray two-thirds of the loss which results from the difference between the cost of acquiring the present properties, and its

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1. Cities and towns have specific authorization to use all meter receipts to provide off street parking, provided that the lots are not over 600 feet from the nearest commercial building and group of 30 or more meters approved by the Department of Public Works. (Chapt. 776, Acts of 1949, ammends Chapt. 40 of general laws by inserting section 22b after section 22a) Gross meter revenues in Cambridge amounted to $60,130 for the first 10 months of 1949.

value as a cleared site for its new use.) However, as Cambridge's grants for this purpose are limited, and there is a good probability that these funds can be used more effectively in other areas, this means of financing will not be proposed in the program which follows. It should be studied further, however, to determine its applicability to each particular situation as it arises.

Location: The location of the needed facilities is one of the most critical aspects of the whole problem. The temptation to accept poor locations in deference to a "cheap" solution should be avoided as false economy, because full return on the investment in terms of use will not result from such a choice.

The following criteria are submitted as being essential to the success of any large scale efforts to correct the traffic and parking problem in Central Square:

1. The lots should be located not more than two blocks from Massachusetts Avenue, the principal destination of the shoppers.

2. The lots must be located to favor easy accessibility by car from the major traffic approaches to the area.

Previous studies of the parking problem in Central Square have considered several alternatives which comply with the criteria listed above. However, it will be seen that requirements of the need presented in this thesis will necessitate the acquisition of almost all usable space which falls under this catagory. The alternatives then are in the order in which these spaces should be selected and developed. The justification for the order selected will be treated in the presentation of the program.

Some people feel that the answer to Central Square's parking problem lies in the construction of open deck, multi-story parking structures. They argue that the added cost would be justified in preference to the expensive alternative of acquiring added space which open lots requires. This possibility was studied by the writer and is rejected (as an immediate proposal, at least) for the following reasons.

1. It is doubtful whether the present cost of land in the area justifies this expensive structure. Studies made by the American Automobile Association indicate that this type of structure is economic only in cases where the cost of providing open lot parking exceeds about $750 per car space and the cost of the site exceeds approximately $3.50 per square foot.[1] Preliminary estimates of cost did not indicate that this situation exists at present in Central Square.

2. An open deck garage does not conveniently satisfy the needs of the persons who must be attracted to the area, the shoppers. Most shoppers only want to stay in the area for one or two hours and it is doubtful whether their interests are best served requiring them to entrust their unlocked cars to attendents and experience the delay of waiting for delivery when they are through shopping. If the facility is designed in such a manner as to allow self-parking, the resulting reduction in car space would raise the cost limitations cited in the preceding paragraph by roughly one-third.

There are other disadvantages which obtain, such as the inflexibility of use of this costly permanent structure and the traffic problems resulting from the added concentration of cars at its entrances

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1. Parking Manual (op. cit.) p. 121.

and exits. However, it is not suggested that this alternative be permanently disregarded, as the future might introduce changes in the situation described above. It is recommended that further consideration and study be given this possibility as the cost situation becomes clarified. Present understanding of the matter does not provide adequate basis for this proposal.

Design: The comments made regarding economy in location apply equally to design. Observations made by the writer of large scale public use lots in other cities have lead to the conclusion that people will use the streets in an area such as Central Square rather than run the risk of damaging their automobiles in tightly laid out lots. Therefore, it is recommended that ample space be allowed for entrances, exits, circulation within the lot, parking and the storage of snow in the winter time. In short, the temptation to "cram" parking sites to maximum capacity should also be avoided as false economy, as the patrons will be discouraged from full use of the facilities.

The design of these facilities should meet the following requirements:

1. Paving: It should be semi-permanent, hard surface with suitable slope to provide for surface drainage. Several types of bituminous concrete are acceptable for this purpose.

2. Marking: Each parking stall should be kept clearly marked with lines painted on the pavement. A median strip separating the rows of parked cars is desirable.

3. Lighting: It is essential that lots which are used at night are adequately lighted.

4. Landscaping: Sufficient space should be provided around the boundaries for screen planting, or in cases where limitations of space require, a suitably designed fence should be constructed.

A drawing showing the proposed layout for one site is included in Appendix B to illustrate recommended space standards.

Administration: The shopper who wants to stay over one hour should be provided for in the first phases of the program. Because parking space convenient to Massachusetts Avenue will be at a premium for quite some time after the program is under way, it is important that the lots are managed in a manner that insures that the space needed by shoppers is not preempted by all day parkers or persons who might leave their cars at Central Square for a period of several hours and proceed to Boston.

Therefore, it is recommended that until the needs of the shoppers are filled, all parking be limited to two hours. As more space becomes available, the all day parkers should be encouraged to use appropriate sectors of the lots by strictly enforcing space at the curb. In cases where the people requiring all day spaces are engaged in private business in the area, they should be charged a suitable fee for use of the facility until the program is paid for. In cases where the all day space is needed by municipal employees the cost should justifiably be borne by the city. The all day parker who works in Central Square could be issued a parking lot permit which would allow the use of designated areas of the parking lot. Suitable police or attendant supervision of these lots must be provided.

Cities in other states have used parking meters in the lots as a

means of supervising time limits to good advantage. Meters provide an efficient means of collecting a nominal sum for administration and maintenance (say 5¢ for the first two hours) and exacting an additional, higher rate for all time after two hours to discourage long time use of the lots. There is some doubt as to the legality of the procedure in Massachusetts without additional enabling legislation. It is recommended that steps be taken to secure the necessary permission to employ meters as a means of regulating the use of space in general use parking lots.[1]

Further recommendations regarding administration are presented in the section entitled Policy Recommendations.

The Program: The program which follows is presented as being effectuated in three phases. Phase one, that which can and should be undertaken immediately. Phase two, that which is to be undertaken in the next fifteen years, coordinated with redevelopment activities in adjacent areas. Phase three, that which is to be completed in conjunction with the construction of the Cambridge Link of the Proposed Inner Belt Expressway, which is assumed to be constructed within fifteen to twenty years. Naturally, the timing of this program will be subject to continual revision as the assumptions of the timing of the larger events upon which the program is predicated change. The sites which are recommended for acquisition are shown on the map on the following page.

Phase One: It is apparent that one of the most justifiable impediments to the acquisition of off street parking sites is the present acute shortage of housing in Cambridge. Until this situation is eased,

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1. Possibly a ruling from the Attorney General would be sufficient.

CENTRAL SQUARE
CAMBRIDGE, MASSACHUSETTS

SCALE (FEET) 0 40 80 160 240 320

PROPOSED
PARKING & CIRCULATION

PHASE ONE
" TWO
" THREE

CENTRAL SQUARE PARKING STUDY · MCP THESIS · M.I.T.
C. DAVID LOEKS · 1949

N

SAINT PAUL ST.
INMAN ST.
TEMPLE CIRCLE
SITE J. 140 SPACES
PERCY PL.
NORFOLK TER.
NORFOLK PL.
SITE K 216 SPACES
FLORENCE PL.
ASHBURTON PL.
WASHINGTON ST.
FISKE PL.
AUSTIN ST.
SITE F. 40 SPACES
BIGELOW ST.
TEMPLE ST.
PROSPECT
SITE G. 30 SPACES
ESSEX
WHITNEY CT.
NORFOLK
SITE H. 150 SPACES
DOUGLASS CT.
DOUGLASS ST.
SITE I 150 SPACES
MAIN ST.
MASSACHUSETTS AVE.
INNER BELT EXPRESSWAY
VERNON ST.
SITE E. 70 SPACES
GREEN ST.
SITE A. 64 SPACES
SITE B. 64 SPACES
PLEASANT ST.
WESTERN AVE.
RIVER ST.
MAGAZINE ST.
SITE C. 108 SPACES
FRANKLIN ST.
PEARL ST.
SITE D. 188 SPACES
BROOKLINE ST.

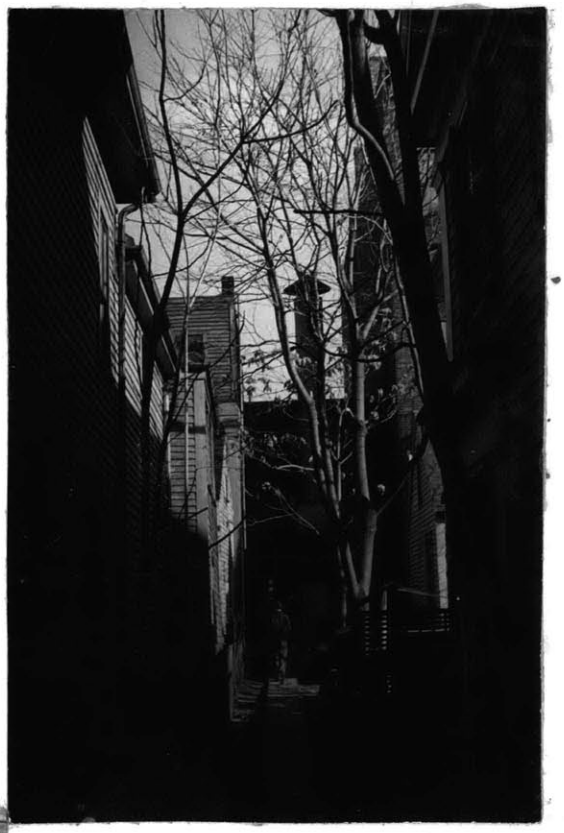
the first off street parking proposals must of necessity be limited to areas which will result in the displacement of a minimum number of families.

Site C (108 spaces): The only large site in the area which fulfills the requirements stated above is located in the block bounded by Magazine, Green, Pearl and Franklin Streets, (8 structures, approximately 16 dwelling units). Eighty cars are now being parked there in merchant operated lots. These people have been reported to have expressed willingness to contribute these lots as part of a larger facility in return for the taxes which they now pay on these parcels. If laid out as indicated in Appendix B this area would accommodate 28 additional cars.

Site F (40 spaces): The present space behind the City Hall could easily be redesigned to accommodate 26 additional cars (by cutting into the present embankment) and thus provide for the elimination of much of the congestion on Inman and Bigelow Streets. If the employees cars were parked in this space, the curb could be kept free for the use of the general public.

Site E (70 spaces): This space is needed to relieve the present congestion on Green Street and Western Avenue near the police station. The eleven structures and sixteen dwelling units on this site are probably the oldest, most crowded and generally undesirable for use as residences in the area. Parts of this block would make a good site for the eventual provision of a small passive recreation park for Central Square. The acquisition of this area for parking purposes would be not only justified by the present situation, but would be a a logical means of preserving the area from more intensive use so that

Site E.....



.....should be acquired for parking and held for eventual use as a city park.

the space can be eventually used for park purposes. This lot should be laid out to provide badly needed truck service to the stores on Massachusetts Avenue.

With the provision of these three facilities it will be possible to effecuate the following needed traffic reforms: Elimination of angle parking on Massachusetts Avenue and replacement by parallel parking (a reduction in capacity of 99 spaces). Prohibit parking on Prospect St. between Massachusetts Avenue and Austin. Prohibition of parking on the south side of Green Street near the Police Station and prohibition of parking on the west side of Bigelow. The inauguration of a comprehensive program of enforcement of present no parking regulations in the area.

Phase Two: Because of the larger scale of the lots which are to be built in this phase it will be necessary to wait until housing in other areas is made available to rehouse the displaced occupants now residing on the sites. In that much of the housing is of sub-standard character, it is possible that the local redevelopment authority will be able to acquire some of these sites, clear them and sell them to the city at their new use value.

Site K (216 cars): It is very desirable that a large space be provided north of Massachusetts Avenue as soon as possible. The usability of site K down to Austin Street has been rendered impractical by the construction of a new bowling alley in the center of the block, which was cleared when the Inman Social Club building burned down.

The small size and peculiar shape of the lots on either side of this building does not render them suitable for use in conjunction with

the proposed lot to the north. It is possible that these sites could be put to better use as commercial enterprises when the present housing is torn down.

Site D (188 cars), Site H (150 cars): The housing on these sites is very bad and is recommended for clearance as soon as possible. These lots should be designed in such a manner as to permit adequate service to the stores on Massachusetts Avenue.

Sites A (64 cars), B (64 cars) and G (30 cars): Because of the small scale of these lots, it is proposed that these be developed and administered principally for the long term parkers in the area.

At this point, approximately 832 additional off street parking spaces will have been provided. While this is being accomplished it should be feasable to further reduce curb parking on the narrow side streets in the area as a means of facilitating access to the parking lots. The specific streets which are to be treated are listed in Table VI., Summary of Parking and Circulation Proposals. Additional one hour meter enforcement should be applied to the remaining curb space on all streets between Franklin and Austin Streets and from Columbia to Bigelow Street during this phase. Prohibition of long term parking on adjacent residential streets should be strictly enforced.

When the Watertown street car line on Western Avenue is replaced by the trackless trolley it will be possible to close River Street to through traffic between Central Square and Pleasant Street and channelize traffic in Central Square as shown on the Proposed Parking and Circulation map on page 82. It will then be practical for all busses terminating at Central Square to use the triangle formed by Western

Avenue, Franklin and Magazine Streets to turn around. The portion of River Street between Franklin and Central Square could continue in use as a bus loading area. It is felt that these measures are more than justified on the basis of the traffic and pedestrian situation described in Part I.

Phase Three: This phase is to be effectuated in conjunction with the construction of the Inner Belt Expressway. It is proposed that approaches and exits from this elevated structure be located in such a way that traffic is not routed directly onto Massachusetts Avenue but designed so that it can by-pass the business district if it so chooses. The arrangement shown on the plan encourages trucks and through traffic to by-pass Massachusetts Avenue and provide needed access to the parking and service areas without encouraging driving into the area on Massachusetts Avenue. The Franklin Street by-pass is conceived of as connecting with Massachusetts Avenue between Bay and Hancock Streets on its western end. It is necessary that Putman Street be widened to River Street so as to allow adequate circulation to and from Massachusetts Avenue which results from closing River Street from Pleasant Street north and the prohibition of left turns at the Central Square intersection.

It is recommended that provision be made for the eventual widening of Prospect Street so as to better provide for the movement of local traffic to and from the north.

Site I (150 cars): The construction of the Expressway and the proposed treatment of the Lafayette Square intersection will necessitate the removal of almost all of the structures from this site. Because

most of these buildings are obsolete even by today's standards, it is proposed that this site be entirely cleared. The portion of the site not shown as being devoted to parking is recommended as being developed for commercial use.

All of the structures which would have to be cleared south of Lafayette Square are also old and are in poor condition structurally for their present use. It is proposed that this area be given first consideration for low intensivity use by the adjacent industries or commercial activities. The wedge shape of this parcel and the one way nature of the traffic at this point does not appear to make it particularly desirable for use as sites for retail stores.

Site J (140 cars): It may be noted that schematically, at least, better distribution of parking facilities would be obtained if a large facility were located north of Massachusetts Avenue and east of Prospect Street. However, such a proposal would be difficult to justify on the basis of present location of the need generators and existing land use. The site selected on the northwest corner of Austin and Essex is actually closer to the "center of gravity" of commercial activity and can be better justified in terms of present and probable future land use. The area selected is predominantly old housing, which if left unmolested would exist as a blighted finger of residences pointed accusingly at the heart of Central Square, trapped between the increasing commercial activity on Prospect Street on one side and a large parking lot on the other. Its best use therefore, is felt to be for needed parking.

Finance: It is recommended that the general principles outlined earlier in this report be employed to pay for this program. The illus-

tration which follows indicates that this program is feasable from the economic standpoint. Although a detailed analysis of the total cost of the program is beyond the scope of this thesis it is possible to make an approximate estimate on the basis of present land values in the area. Present knowledge of the situation indicates that the proposals directly chargeable to parking might well run, roughly, $800,000.

Assuming a twenty year amortization period, the average yearly cost of the program would be $40,000 per year. Net revenues from the 332 meters in the area amount to about $30,000 which, if applied to parking purposes, would require that $10,000 yearly be raised by other means. If that is to be the case, a 2.8% increase in the total commercial valuation of the area (in the form of a betterment assessment) would supply this amount.[1] This would mean that the average contribution of the 100 commercial parcels in Central Square would amount to only $100 each, per year. The additional profit from increased sales could easily offset this cost.

It can be seen then that even if the assumptions regarding total cost are in error by as much as 25%, the per property owner cost would only increase $100 per year. Thus, it can be concluded that the financing of the program should not offer any major impediments. In cases where relatively large capital outlays are required, a bond issue may be necessary. However, if ample funds are available, a pay-as-you-go arrangement is favored by many authorities on municipal finance.

Summary: Table VI. summarizes the program which is submitted as

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1. Based on a $9,000,000 valuation and $40.00 tax rate.

being accomplished within an approximate twenty year period. Before the expressway and its connections are constructed, further study should be made of Central Square's future retail space needs and the solution proposed here should be tested in the light of its results. In as much as the parking program presented here would require the substantial modification of the present zoning in the area, further study of Central Square's future retail space requirements would be necessary as a basis for determining new use district boundaries.

Of necessity, many of the proposals are based on assumptions which only the passage of time and the march of events can verify or disprove. It is expected that as the underlying assumptions change, that the program is sufficiently flexible to be accommodated to the changing situation.

Table VI. Summary of Parking and Circulation Proposals.

Phase	Proposed Site	Parking Capacity	Space Provided Toward Need		Circulation Proposals
I.	C	108	38[a]		Institute parallel parking on Massachusetts Avenue.
	F	40	26[b]		Prohibit parking on Prospect.
	E	70	70		Prohibit parking on west side of Bigelow.
			134	134	Prohibit parking on south side of Green near police station.
					Enforce parking regulations throughout the area.
II.	K	216	216		Prohibit parking on Temple, Essex, Norfolk, Douglass, and Green from Brookline to Pearl.
	D	188	188		Prohibit parking on west side of Magazine, Pearl, Brookline, on north side of Franklin, Austin.
	G	30	30		Prohibit parking on south side Green from Brookline east.
	H	150	150		Channelize traffic in Central Square.
	B	64	64		Meter enforcement of one hour limit on all streets between Franklin and Austin.
	A	64	64		Prohibit long time parking on adjacent residential streets.
			712	712	
III.	I	150	150		Inner Belt Expressway and adjuncts. Widen Franklin, Pleasant. Institute two way traffic on Franklin.
	J	140	140		
	D	-100[c]	-100		
			190	190	
				1036	TOTAL

a. 70 spaces are existing on the site.
b. 14 spaces are existing on the site.
c. Removed by construction of expressway and adjuncts, (estimated).

Recommendations for Basic Community Policies Regarding Parking.

What policies should the community adopt to insure that adequate provision for parking is made on a continuing basis? The following recommendations are briefly outlined as a general means of effectuating the program for Central Square and tackling the parking problem on the comprehensive community wide scale which the situation requires.

Parking Authority: It is believed that the parking problem is of sufficient magnitude (throughout the whole of Cambridge, as well as Central Square) to justify the creation of a special agency or authority to deal with this problem. This agency should be an official organization which acts for the community in dealing with the problems of parking on a community wide basis.

In general, such an agency should have the authority to:[1]

1. Acquire necessary land for parking facilities (by lease or purchase, including power of condemnation).

2. Obtain necessary funds for financing its operations including the making of plans and studies.

3. Hire and fire necessary staff.

4. Contract for construction of facilities.

5. Manage and operate parking facilities which it has acquired.

6. Sell or otherwise dispose of property no longer needed.

It is recognized that many of the powers listed above are already available in existing agencies. However, the important advantage which the creation of a parking authority provides is the clear delegation of

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1. Adapted from Parking Manual. (op. cit.) p. 150.

authority and responsibility for dealing with the parking problem to one agency. If the key interests of the community were represented in this agency (as on the Planning Board, for instance), the political problems resulting from policy formulation and administration would be vastly simplified.

It is doubted that such an authority could be created without special state enabling legislation. Therefore, it is recommended that this proposal be given further study to determine its usefulness within the present administrative frame work of Cambridge government, and if found workable, needed permissive legislation be obtained.

Zoning: It is recommended that the Cambridge zoning ordinance include a requirement for off street parking in conformance with a prescribed schedule appropriate to each use.

It is also recommended that the present portion of the ordinance relative to the regulation of the construction of loading facilities on new buildings be given more explicit definition in the form of a prescribed set of minimum standards for the off street loading requirements of various specific categories of building.

Past administration of the present zoning ordinance has been characterized by an unfortunate tendency to give more consideration to the specific needs of individuals than to the more subtle but far more important long term needs of the community.

In Central Zquare alone, two instances can be cited where new buildings were permitted to be constructed with loading facilities located contrary to the intent of the zoning ordinance. A third building has recently been authorized to be constructed in the same manner.

As shown by the pictures on page 59, the results of this policy are contributing to present congestion problems in the area today. Any justification for this policy on the grounds of protecting tax revenues is fallacious when the harm that results actually entails a greater cost to the community in the long run in terms of public safety, convenience and general welfare.

The following quotation is from a previous survey of traffic and circulation problems in Cambridge.

> "It is to be regretted that we have so many narrow streets... Wide streets in a town are attended with several very great advantages to the citizens. They afford a freer circulation and a purer state of the air in the warm seasons. They operate as a protection against the spread of fires. They give opportunity for planting their borders with trees, which being themselves an ornament and an additional security against the spread of conflagration, afford in summer a comfortable shade to the houses which they adorn, and the passengers who walk the streets and tend to the greater health of the community by the effects on the atmosphere."

This report is dated June 15, 1838.[1] Although the change in our technology since then has resulted in a more fundamental justification for adequate circulation, the reference cited does serve to dramatize the short-sightedness of perpetuating patterns which were already obsolete over 100 years ago.

Some one once said that the ills which beset governments will never be eliminated until "philosophers are kings and kings are philosophers". Perhaps it is equally true that our present out moded city patterns will never be corrected until city planners are public administrators and public administrators are city planners.

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1. Streets of Cambridge. (op. cit.) p. 28.

Medford, Massachusetts

Central Square

Appendix A

The questionaire on the following page was mailed to eighty of the members of the Central Square Business Men's Association. Of the eighteen replies received, fifty three cars were reported as being driven to work in Central Square.

CENTRAL SQUARE BUSINESS MEN'S ASSOCIATION, INC.

CAMBRIDGE 39, MASS.

10 November, 1949

Dear Member:

Mr. David Loeks, a graduate student at M.I.T., is conducting a parking survey of Central Square as part of his thesis for a Master's Degree in City Planning. Inasmuch as a study of this kind may well be of real benifit to Central Square, your Board of Directors and President feel that it deserves the wholehearted cooperation and support of all our members. The Cambridge Chamber of Commerce and the Cambridge City Planning Board also favor this project and have assured us that they are willing to help in every way possible.

The following information relative to your business is needed in order to calculate over-all parking needs in the area. This data should be of positive value in improving the parking situation by establishing the basis for computing the total number of required spaces.

Name of Business_____

Address_____

Approximate gross floor area (on ground floor)_____

Estimated average daily number of customers_____

Total number of employees cars being driven to work_____

How do you feel that the parking problem should be solved?_____

Would you kindly mail this questionaire at your earliest convenience to the following address,

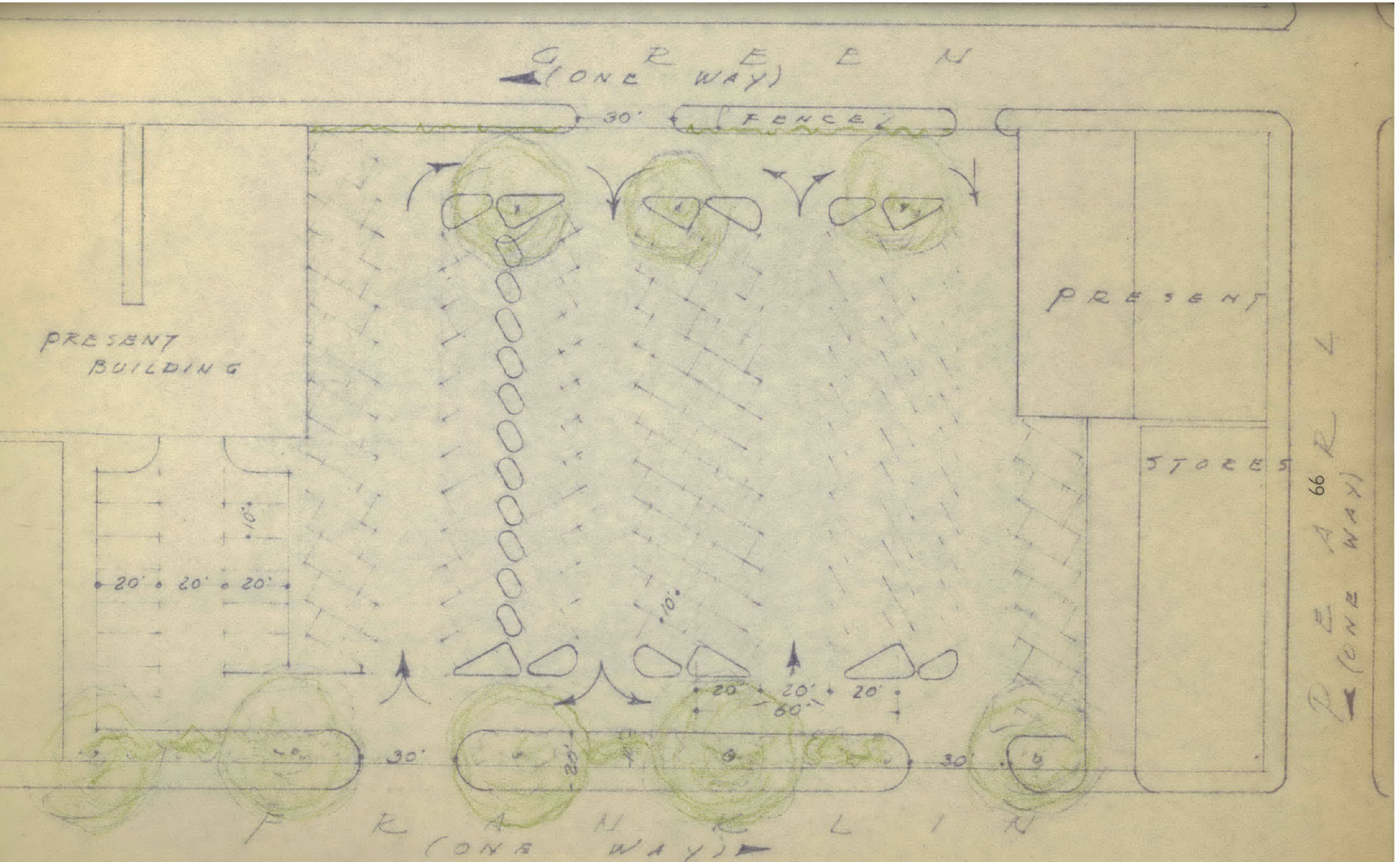
Mr, C. David Loeks
Care of: The Office of the Cambridge Planning Board
57 Inman Street
Cambridge 39

Your cooperation, which is essential to the success of this undertaking, is sincerely appreciated.

William F. Galgay, President

Appendix B.

"Site C", suggested layout showing recommended space standards.



"SITE C". SUGGESTED LAYOUT SHOWING RECOMMENDED SPACE STANDARDS

SCALE: 1" = 40'

C. D. LOEHR

B I B L I O G R A P H Y

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